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Chapter 1 Introduction

1.1 Before You Begin

This manual assists a process engineer in programming the controller for control and supervision of ACS600 series of drives, DCS600 and DCS500 drive units using the AdvaBuild type circuits DRIS3, DRIS5, DRIE4 and DRID1.

This guide tells you how to install and use the type circuit in Function Chart Builder, describes its parameters and connections, but it does not teach you how to use Function Chart Builder or Advant Controller system programming. To learn how to program an Advant Controller, attend system engineering courses offered by the local ABB representative and consult the manuals listed at the end of this chapter.

This book is not intended to be the sole source of instruction for AdvaBuild software.
Those people involved in system engineering should attend the applicable system engineering courses offered by ABB.

1.2 Equipment Requirements

The type circuits need Advant Controller 400 series Controller of version 1.3 or higher.
The Engineering stations must support Advant Controller 400 1.3. The Engineering Station 100 AdvaBuild for windows must be of version 1.3 or higher. The Function Chart Builder used in Engineering station must be of version 4.3 or higher.

Table 1-1 lists the Drive System software versions for the different type circuits.

Table 1-1. Drive System software versions

Type Circuit	Drive System
DRIS3	ACS600 with Standard Application software version 3.0.
DRIS5	ACS600 with Standard Application software version 5.0.
DRIE4	ACS600 with System Application software version 4.2 or later and DCS600.
DRID1	DCS500 with software version 21x227 or later.

1.3 How to Use This Book

This book is organized into chapters and sections as shown in Figure 1-1.

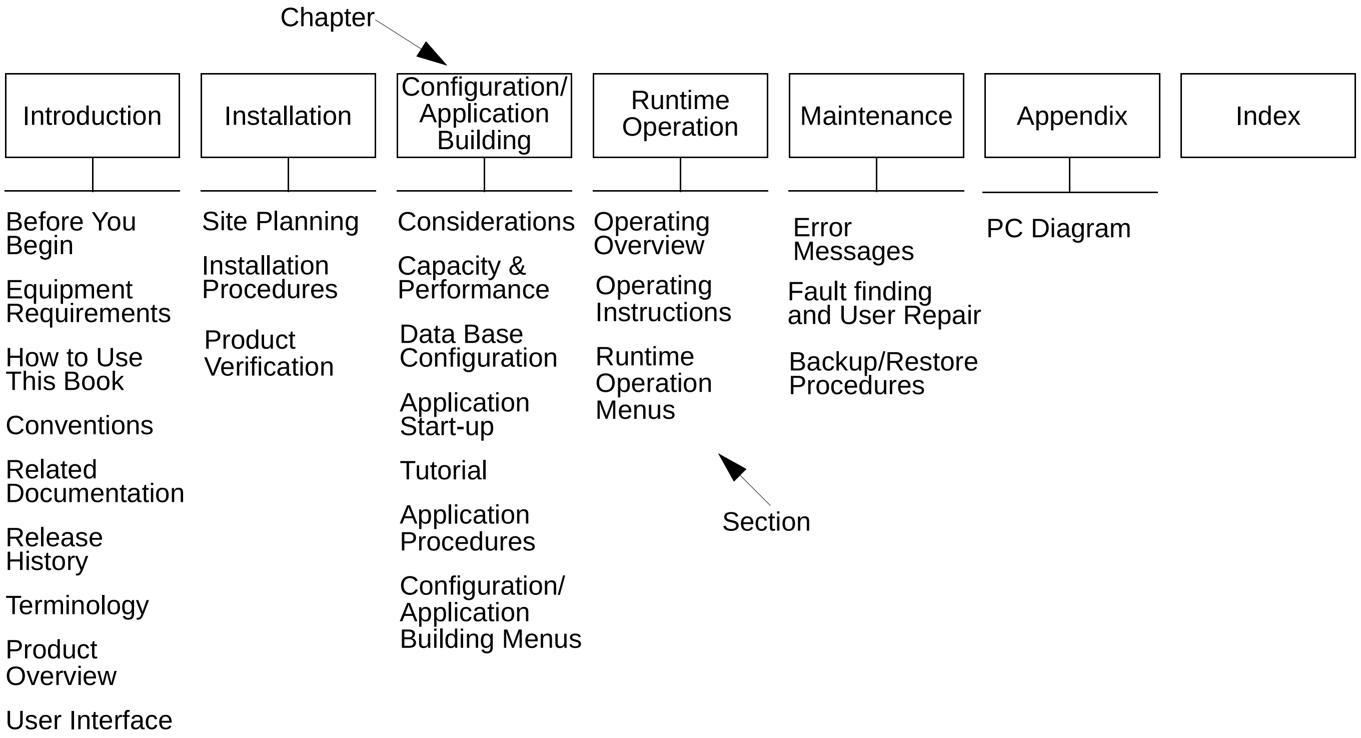


Figure 1-1. Organization of Manual

1.4 Conventions

The following conventions are used throughout this manual for the presentation of material:

- The words in proper names of screen elements (for example, the title in the title bar of a window, the label for a field of a dialog box) are initially capitalized.
- The names of keyboard keys are boldfaced.
  - Initial capital letters are used for the name of a keyboard key if it is labeled on the keyboard. For example, the **Return** key or <**Return**>.
  - Lowercase letters are used for the name of a keyboard key that is not labeled on the keyboard. For example, the **space bar**, **comma key**, and so on.
  - In descriptions, the word "key" is used in conjunction with its name. For example, pressing the **Return** key initiates the process.
  - In tables and procedures, angle brackets replace the word "key." For example, press <**Return**>.
  - A dash is used to indicate that you must simultaneously press several keys. For example, <**Ctrl-C**> indicates that you must hold down the **Control** key while pressing the **C** key.

  - The phrase “press and release” is used to indicate that you sequentially press several keys. For example, to close a window, press and release **<Alt>**, and then **<F4>**. This indicates that you press and release the **Alt** key, and then you press and release the **F4** function key.
- The names of push and toggle buttons are boldfaced.
  - Initial capital letters are used for the name of a push or toggle button labeled on the display. For example, the **OK** button.
  - In descriptions, tables and procedures, the word “button” is used in conjunction with its name. For example, pressing the **OK** button initiates the process.
- The names of menus and menu items are boldfaced.
  - Initial capital letters are used for the name of menus listed in the menu bar. For example, the **File** menu.
  - Initial capital letters are used for the name of menu items. For example, to open a new window, choose **New** from the **File** menu.
- System prompts/messages are shown in the Courier font, and user responses/input are in the boldfaced Courier font. For example, if you enter a value out of range, the following message is displayed:

```
Entered value is not valid. The value must be 0-30.
```

In a tutorial, you may be told to enter the string TIC132 in a field. The string is shown as follows in the procedure:

TIC132

1.5 Related Documentation

Table 1-2 lists all documentation related to the use of FCB Drives Type Circuit.

Table 1-2. Related Documentation

Category	Title	Description
System	Advant Fieldbus 100 User's Guide	Describes the communication interface between Advant Controller 400 and the Drives System.
Station	Advant Controller 450 User's Guide	Describes the controllers that runs this type circuit.
	Advant Controller 410 User's Guide	
	Advant Station 100 Series Engineering. Station User's Guide.	Describes the hardware and setup of Advant Station 100 Series Engineering Stations, including the Advant Station 100 Series Engineering Board.
	Advant Station 500 Series Engineering Station User's Guide.	Describes the hardware and setup of Advant Station 500 Series Engineering Stations.

Table 1-2. Related Documentation (Continued)

Category	Title	Description
Software	Functional Units Part 8, DRICONS User’s Guide.	Describes drive unit installation, some details on application programming and operator interface for standard drive.
	Functional Units Part 9, DRICONE User’s Guide	Describes drive unit installation, some details on application programming and operator interface for engineered drive.
	Advant Station 100 Series Engineering Station AdvaBuild for Windows Environment User’s Guide	Describes the hardware and setup of Advant Station 100 Series Engineering Stations, including the Advant Station 100 Series Engineering Board.
	AdvaBuild for Windows Application Builder User’s Guide	Describes installation of AdvaBuild for Windows components and contains the operating instruction of Application Builder, Bus Configuration Builder, and support functions of AdvaBuild for Windows.
	AdvaBuild for Windows Function Chart Builder User’s Guide.	Describes the application programming tool in Engineering Station 100
	Engineering Methods AS 500 ES Reference Manual.	This manual describes methods for plant engineering using the following AdvaBuild software packages: • AdvaBuild Basic Functions – Structure Builder – Template Builder – Function Chart Builder – Plant Documentation Builder. • AdvaBuild Optional Software – Document Builder – Diagram Builder – Electrical Diagram Builder – On-Line Builder – Display Builder.

Table 1-2. Related Documentation (Continued)

Category	Title	Description
Software cont.	AdvaBuild Function Chart Builder User's Guide.	Describes the application programming tool in Engineering Station 500
	AMPL Application Building Reference Manual	Contains tutorial for configuration and application programming of Advant Controllers 410/450 controllers.
	PC Elements Advant Controller 400 Series Reference Manual.	Describes all PC Elements available in Advant Controller 400 in detail.
	Data Base Elements Advant Controller 400 Series Reference Manual.	Describes all DB Elements available in Advant Controller 400 in detail.
	AMPL Configuration Advant Controller 400 Series Reference Manual	Contains instructions for configuration and application programming of Advant Controller 410/450 controllers including command descriptions. The topics are: AMPL configuration principals, application programming, commissioning and testing, on-line editing, documentation, backup and transfer of application data
	Programming Manual ACS 600 Frequency Converters 2.2 to 630 kW	Manual for controlling and programming ACS 600 with standard application
	Programming Manual ACS 600 Multi Drive	Manual for controlling and programming ACS 600 with system application
	Software Description DCS 500B	Manual for controlling and programming DCS 500

1.6 Release History

Table 1-3 lists the major milestones in the development of Drive System type circuits.

Table 1-3. Release History

Version	Description
1.0	This is the initial release of DRIS3.
1.1	Release of DRIS3 and initial release of DRIS5, DRIE4 and DRID1.

1.7 Terminology

The following is a list of terms associated with Drive System type circuits that you should be familiar with.

Term	**Description**
ACS600	**A**lternating **C**urrent **S**eries of standard frequency converter
DB	**D**ata **B**ase
DCS500	**D**irect **C**urrent **S**eries of standard power converter
DDS	**D**rive **D**ata **S**et contains available data for Advant Controller 400 data exchange. The Drive Data Set is called Data Set in the Drive documentation.
DRID1	Type circuit for **DRI**ve system **D**CS500 with software version 21x227 or later.
DRIE4	Type circuit for **DRI**ve system **E**ngineered ACS600 with software version **4**.2 and DCS600.
DRIS3	Type circuit for **DRI**ve system **S**tandard ACS600 with software version **3**.0
DRIS5	Type circuit for **DRI**ve system **S**tandard ACS600 with software version **5**.0
Drive	A **Drive** is essentially a motor controller which can control the operation characteristics of a motor (on/off, speed control, torque control, etc.).
FCB	**F**unction **C**hart **B**uilder
FCI	**F**ieldbus **C**ommunication **I**nterface (FCI) contains the interface to the fieldbus (Advant Fieldbus 100), Module Bus interface and power regulators.
IU	**I**nstance **U**nique symbols
PU	**P**roject **U**nique symbols
TC	**T**ype **C**ircuit.

1.8 Product Overview

The drive type circuits are realized in the source code files dris3_a1.tcs, dris5_a0.tcs, drie4_a0.tcs and drid1_a0.tcs.

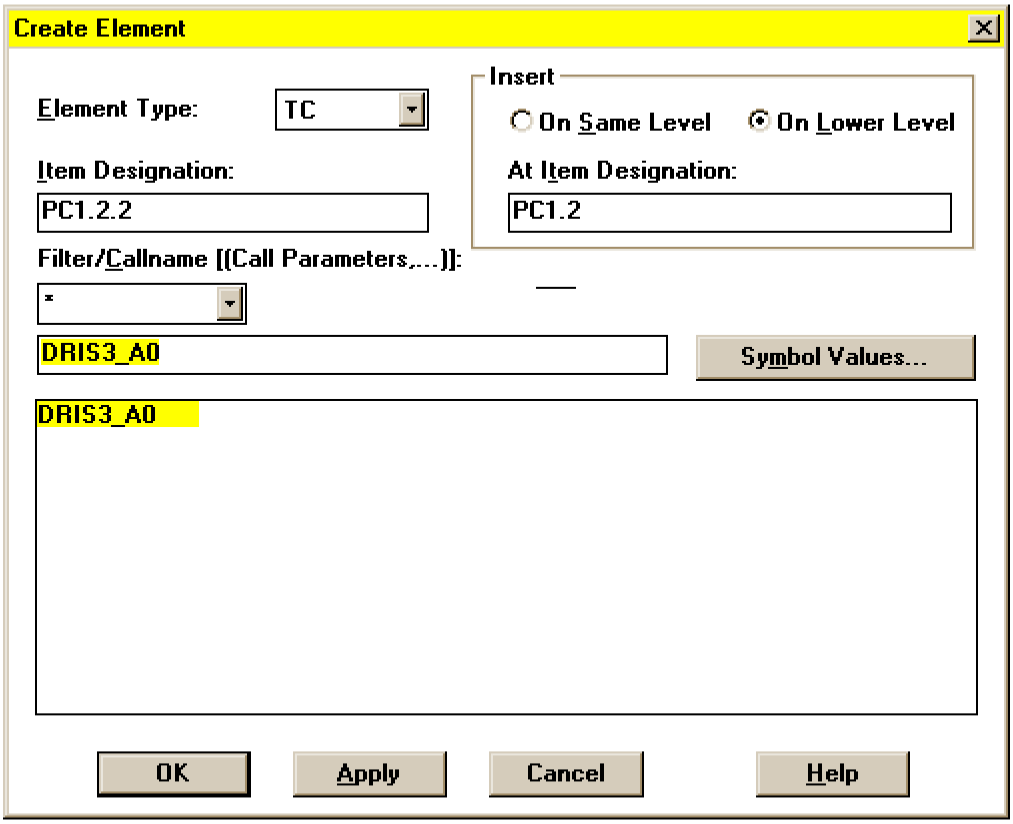
The functions are:

- At instantiating
  - Selection of presentation of diagnostic information for DRIS3 and selection of presentation of fault and alarm information for DRIE4 and DRID1.
  - Definition of IU symbols and PU symbols.
- At application building
  - Connections of interlocks, orders and external references from other PC elements.
  - Connections of status, selected point of control and actual values to other PC elements.
- In runtime
  - Handle different operator point of control.
  - Sending operator commands to the drives system.
  - Receiving status from the Drives System.
  - Select what data from the Drives System to be presented to the operator.
  - Handling of interlocks and external references.

1.9 User Interface

There are three types of user interfaces, related to the three groups of functions. The first two are used by an engineer and the third is used by the operator.

At instantiating time AdvaBuild for Windows shows a list of IU parameters that need values to be entered and PU parameters that are accepted or changed.



Element Type: TC

Item Designation: PC1.2.2

Insert

○ On Same Level ● On Lower Level

At Item Designation: PC1.2

Filter/Callname [[Call Parameters,...]]: *

DRIS3_A0

DRIS3_A0

Figure 1-2. Create Element Dialog Box

After instantiating there are inputs and outputs to be connected.

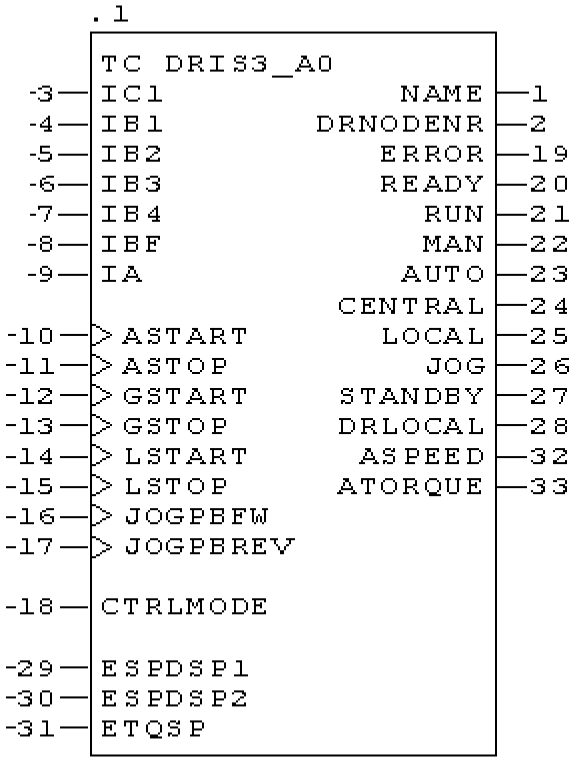


Figure 1-3. DRIS3 TC Element in Functional Chart Builder

The operator has several displays and a dialog available. The most detailed display is the object display. See *Functional Units Part 8, DRICONS User’s Guide* and *Functional Units Part 9, DRICONE User’s Guide*.

Chapter 2 Installation

2.1 Site Planning

The Drive System type circuits require Advant Controller 410/450 of version 1.3 or higher.

If Engineering Station 100 is used, the AdvaBuild for Windows must be of version 1.3 or higher.

If Engineering Station 500 is used, the FCB must be of version 4.3 or higher.

2.2 Installation Procedures

2.2.1 Engineering Station 100

Advant OCS Product Guide for environmental considerations.

Advant Station 100 Series Engineering Station User’s Guide.

If you are working on a PC of your own, consult its user documentation.

The files on the release floppy disk are:

- DRIS3_A1.TCS
- DRIS5_A0.TCS
- DRIE4_A0.TCS
- DRID1_A0.TCS.

Put the floppy disk with the Drive System type circuit release files into the floppy disk drive.

If AdvaBuild for Windows is installed in your PC, copy the file .TCS to C:\TCLEV1, or if changed where the environment variable TC$LEV1 refers to.

If AdvaBuild for Windows is installed in a server, copy the file .TCS to <server drive letter>:\TCLEV1, or if changed where the environment variable TC$LEV1 reefers to.

This will make the Drive System type circuits available to all projects in that Engineering Station.

For a project specific installation copy the file to project_root\project*\NODES\PR_TC\TCDATA, for example, of C:\PROJ\WATER\NODES\PR_TC\TCDATA.

See also *AdvaBuild for Windows Application Builder User’s Guide*.

2.2.2 Engineering Station 500

Advant OCS Product Guide for environmental considerations.

Advant Station 500 Series Engineering Station User's Guide.

The files on the release tape are:

- DRIS3_A1.TCS
- DRIS5_A1.TCS
- DRIE4_A0.TCS
- DRID1_A0.TCS.

Insert the release tape into the tape station.

Position to the type circuit directory, /tc_lev1, by typing:

```
cd /tc_lev1
```

or, if a project specific installation is preferred:

```
cd /root/ project name/nodes/pr_tc
```

in a terminal window.

Copy the files from the tape by typing:

```
tar xv
```

in the same window.

2.3 Product Verification

See Section 3.4, Application Start-up.

Chapter 3 Configuration/Application Building

3.1 Considerations

Before inserting the Drive System type circuits in an application program some data about the drive and its connection need to be known.

For each drive and motor the following data must be obtained:

- Name of the drive object (motor).
- Description text.
- Process section for alarm treatment.
- Decide if diagnostic data shall be available to the operator.
- What setpoint and actual values to present in the object display.
- Description texts for interlocks.
- Max and min limits for torque, current and reference values.
- Nominal values for current and torque.

These parameters are described in detail in Section 3.5, Tutorial.

In each PC program where the Drive System type circuits is to be inserted, the program structure with execution controlling PC elements (such as CONTM, SEQ, and so on) must be present. The type circuits do not have such elements internally. The "top" element in the Drive System type circuits is one FUNCM.

3.2 Capacity and Performance

Table 3-1. Execution time

Type circuit	AC410	AC450
DRIS3	3,01 ms	0,97 ms
DRIS5	3,74 ms	1,22 ms
DRIE4	4,44 ms	1,45 ms
DRID1	3,76 ms	1,24 ms

Table 3-2. Memory consumption

Type circuit	Memory
DRIS3	5 kilobytes
DRIS5	4 kilobytes
DRIE4	5 kilobytes
DRID1	3 kilobytes

3.3 Data Base Configuration

Table 3-3 lists which database elements that have to be added to the database dimensioning (see *AMPL Configuration Advant Controller 400 Series Reference Manual*) for each drive object in the controller.

Table 3-3. Database dimensioning

Type Circuit variant	DRISTD	DRIENG	MMCX
DRIS3 with diagnostics	1	-	2
DRIS3 without diagnostics	1	-	1
DRIS5 with diagnostics	1	-	2
DRIS5 without diagnostics	1	-	1
DRIS5 with fault	1	-	2
DRIS5 with alarm	1	-	2
DRIS5 with fault and alarm	1	-	3
DRIE with fault and alarm	-	1	3
DRIE with fault	-	1	2
DRIE with alarm	-	1	2
DRIE without fault and alarm	-	1	1
DRID with fault and alarm	-	1	3
DRID with fault	-	1	2
DRID with alarm	-	1	2
DRID without fault and alarm	-	1	1

Dimensioning data are also available at the end of the data base source code (*.BAX) for each controller.

3.4 Application Start-up

Start the Function Chart Builder (or Node Structure Function Chart Builder) from the AdvaBuild Application Builder.

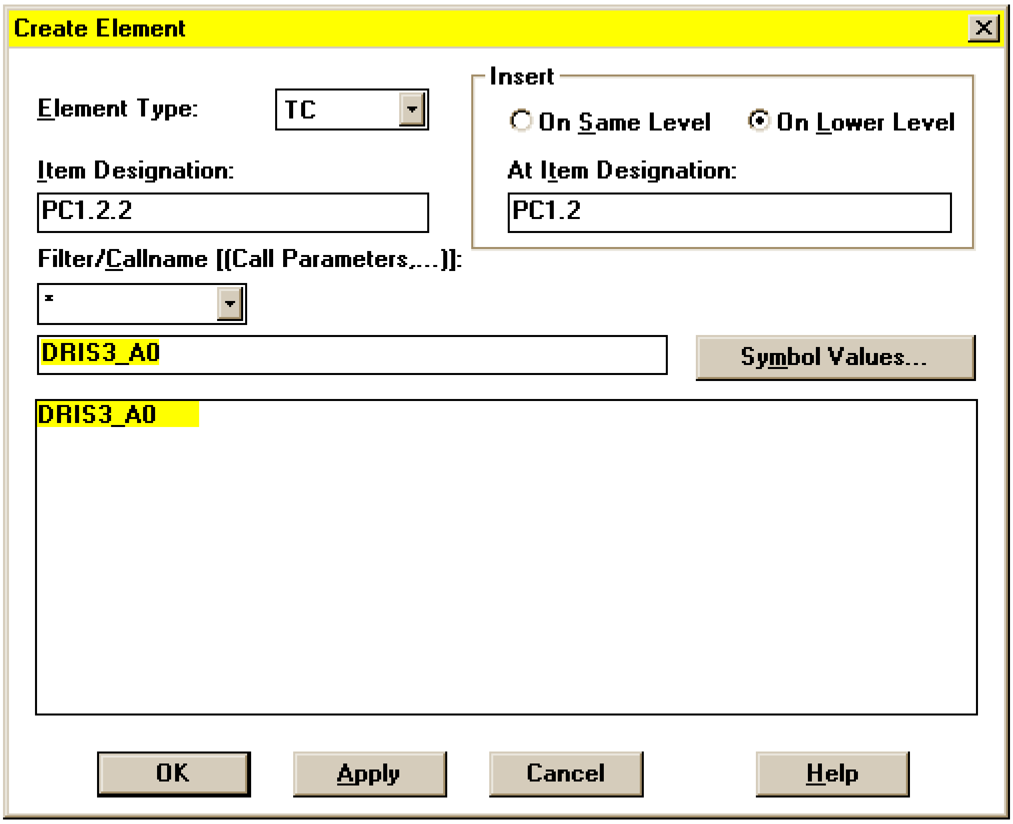
Make a PC-program.

Select one CONTRM.

Choose **Insert** from the **Edit** menu.

Select **TC** in **Element Type in** the dialog box that appear.

The dialog box will than look like this:



Element Type: TC

Item Designation: PC1.2.2

○ On Same Level ● On Lower Level

At Item Designation: PC1.2

Filter/Callname [(Call Parameters,...)]: *

DRIS3_A0

DRIS3_A0

Figure 3-1. Create Element Dialog Box

The Drive System type circuit shall now appear in the list of available type circuits.

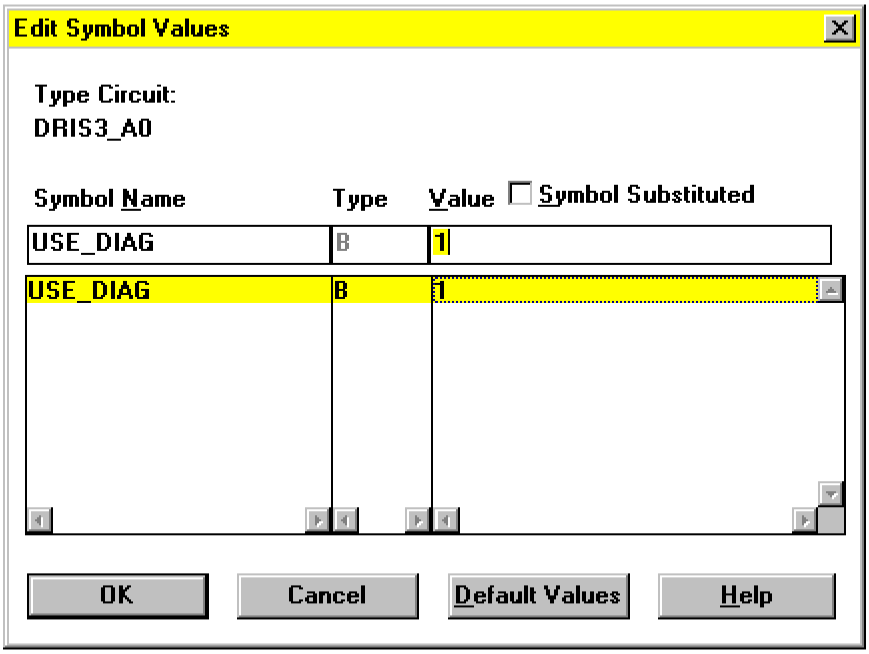
If it is not visible here, check the following:

- Did you get an error message at start up of the FCB, "Error building element list TC"? In that case you got an output window in FCB referring to an error list file (TCERRORS.LIS). Check this file.
  If any error in this file refer to a drive type circuit, try to reinstall the type circuit code. If you still get the same error contact ABB.
- If no error message appeared at start up of the FCB, and the type circuit is missing, the FCB did not find type circuit.
  Check the three possible install locations, C:\TCLEV1, C:\TCLEV2 and project_root\project*\NODES\PR_TC\TCDATA. If the drive type circuit is not available in any of this locations with the correct file name reinstall.
  If it is still not available contact ABB.

3.5 Tutorial

Here follows an example of how you instantiate a drive type circuit, DRIS3. The procedure is the same for all drive type circuits, except for the different parameters.

In the dialog box in the previous chapter select DRIS3_A0 and press the button **Symbol Values...**. Now a new dialog box appear:



Edit Symbol Values

Type Circuit:
DRIS3_A0

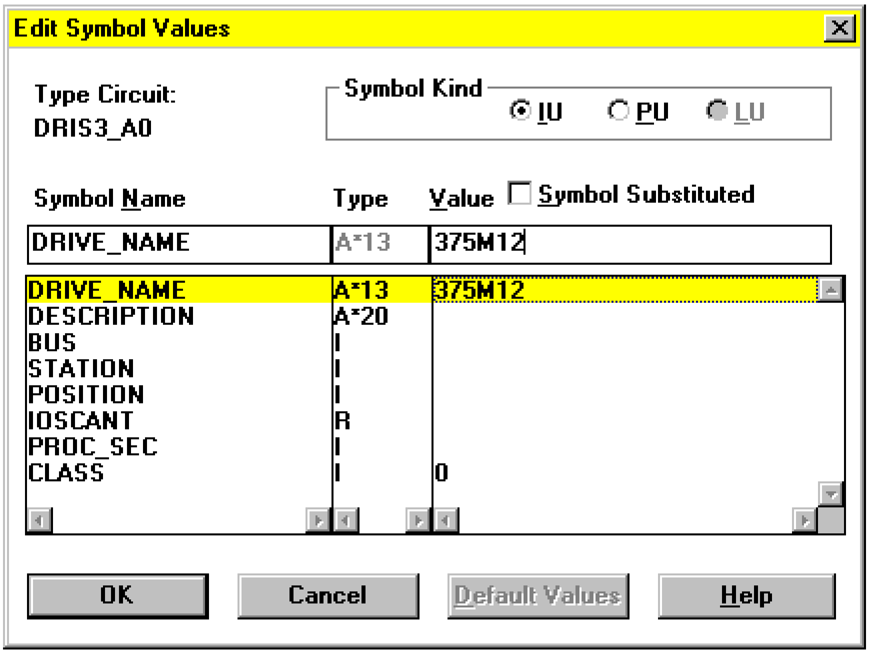
☐ Symbol Substituted

Symbol Name	Type	Value
USE_DIAG	B	1

Figure 3-2. Select Variant Dialog Box

If you want the diagnostics function and /or speed setpoint in rpm press button **OK**, if not enter `0` and the press **OK**.

Now a second dialog box appear:



Type Circuit:
DRIS3_A0

● IU ○ PU ○ LU

Symbol Name: DRIVE_NAME
Type: A*13
Value: 375M12
☐ Symbol Substituted

Symbol Name	Type	Value
DRIVE_NAME	A*13	375M12
DESCRIPTION	A*20	
BUS	I	
STATION	I	
POSITION	I	
IOSCANT	R	
PROC_SEC	I	
CLASS	I	0

Figure 3-3. Edit IU Symbol Values Dialog Box

Symbol Kind IU is selected by default. IU's is symbols that have unique values for each instance of the type circuit. Those who don't have default values must be given valid values here.

DRIVE_NAME is the name of this particular drive object. Enter a valid name. See Section 3.6, Application Procedures for name limitations. Example: **375M12**.

DESCRIPTION is a descriptive text used for operator presentation. Example: **Main water supply pump**.

BUS is the number of the bus connected to the I/O station for the actual drive.

STATION is a positive number 1 - 79 of the I/O station.

POSITION is a positive number (101 - 112), (201 - 212) - (701 - 712).

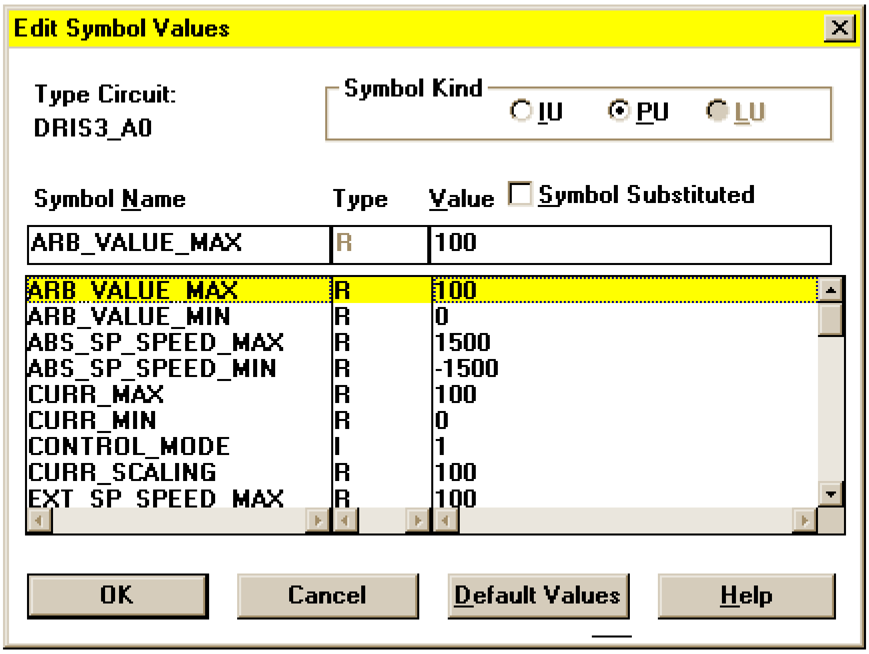
IOSCANT defines the cycle time to be used on Advant Fieldbus 100 to send/receive drive process data.

For more description on these parameters see *Functional Units Part 8, DRICONS User's Guide.*

PROC_SEC is the process section number used for alarm and event treatment.
Valid values are -1 - 16.

CLASS you do not need to change them.

If you then select **Symbol Kind PU** the following list is shown:



Symbol Name	Type	Value
ARB_VALUE_MAX	R	100
ARB_VALUE_MIN	R	0
ABS_SP_SPEED_MAX	R	1500
ABS_SP_SPEED_MIN	R	-1500
CURR_MAX	R	100
CURR_MIN	R	0
CONTROL_MODE	I	1
CURR_SCALING	R	100
EXT_SP_SPEED_MAX	R	100

Figure 3-4. Edit PU Symbol Values Dialog Box

PU´s are symbols that may be changed. All of them have standard values.

Press **OK** now to instantiate the type circuit.

In the PC diagram window of the FCB the instantiated type circuit,DRIS3, appears like this:

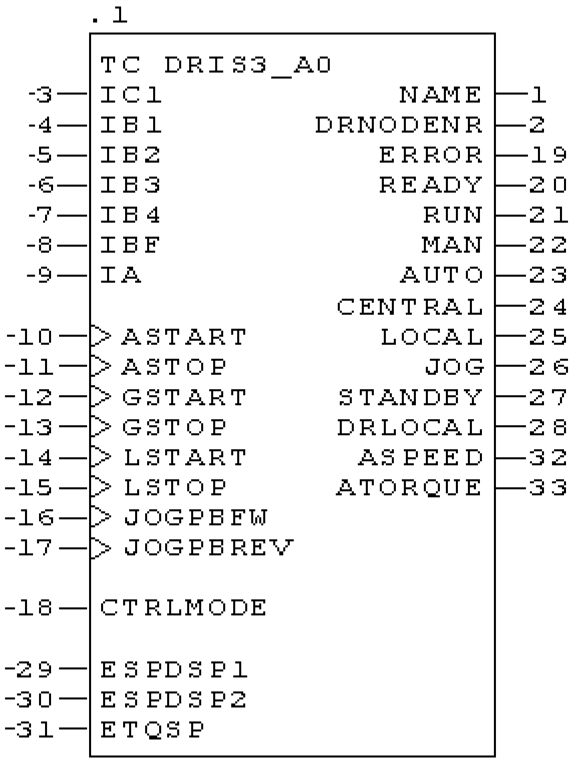


Figure 3-5. TC Element in Functional Chart Builder

In the PC diagram window of the FCB the instantiated type circuit, DRIS3, appears like this, if the type circuit war instantiated with USE_DIAG = 0:

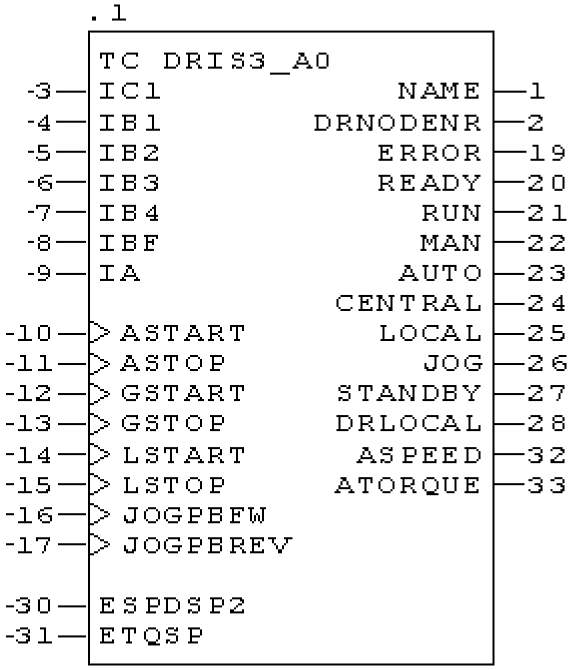


Figure 3-6. TC Element in Functional Chart Builder with USE_DIAG=0

Now you have to connect the terminals to the data base and other PC elements. Example:

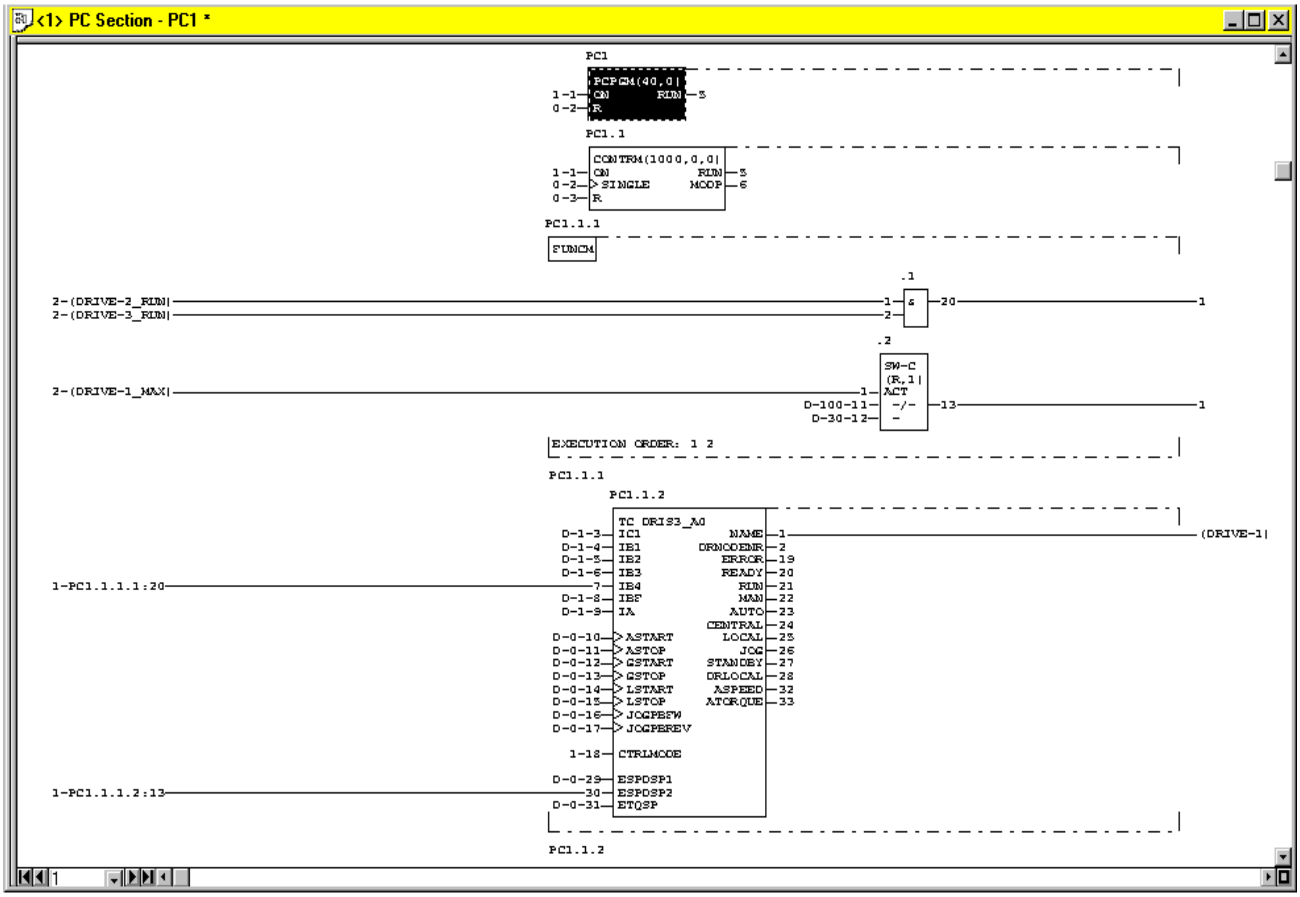


Figure 3-7. Application Program Example

3.6 Application Procedures

3.6.1 DRIS3

To create application programs using DRIS3 is done in two major steps:

- Instantiate the type circuit.
- Connect the terminals on the instantiated type circuit.

To instantiate the type circuit do the following:

- Select the PC element (or instantiated type circuit or located circuit), below or behind (depending of level) which you want to insert the new PC element (or type circuit or circuit).
- Choose the Edit | Create command.
- Select **TC** in **Element Type**.
- Select DRIS3_A0 and press the button **Symbol Values...**.
- In the first dialog box, if you want the diagnostics function and /or speed setpoint in rpm press button **OK**, if not enter `0` and the press **OK.**

Table 3-4. DRIS3 Variants

Variant Name	Description
USE_DIAG	= True creates an additional MMCX data base element for storing diagnostic data from the drive. This data base element is also needed for speed setpoint values in rpm. **USE_DIAG** = False do not creates an additional MMCX data base element. Default value is 1.

- – Now a second dialog box appear
- – **Symbol Kind IU** is selected by default. Those who do not have default values must be given valid values here.

Table 3-5. DRIS3 IU Symbols

Symbol Name	Description
DRIVE_NAME	DRIVE_NAME is the name of this particular drive object. The maximum length is 13 characters. The following characters can be used throughout the Advant System (see AdvaCommand Basic Functions, Section 5.1.5.9 Check for Valid Input): ’0’ - ’9’, ’a’ - ’z’, ’A’ - ’Z’, ’-’, ’_’, ’.’.
	In addition the set of national characters is allowed. These characters are equivalent to the 7-bit ASCII characters ’@’, ’^’, ’[’, ’\’, ’]’, ’‘’, ’{’, ’|’, ’}’, ’~’.
DESCRIPTION	DESCRIPTION is a descriptive text used for operator presentation.
BUS (1)	BUS is the number of the bus connected to the I/O station for the actual drive.
STATION (1)	STATION is a positive number 1 - 79 of the I/O station
POSITION (1)	POSITION is a positive number (101 - 112), (201 - 212) - (701 - 712)
IOSCANT	IOSCANT defines the cycle time to be used on Advant Fieldbus 100 to send/receive drive process data. For a detailed description on selecting proper values for **IOSCANT** see “Capacity and performance” in *Functional Units Part 8, DRICONS User’s Guide*.
PROC_SEC	PROC_SEC is the process section number used for alarm and event treatment. Valid values are -1 - 16.
CLASS	CLASS subdivides process section. Used by status list function in Operator Station. Default value is 0.
FIRSTDDS	FIRSTDDS defines the first Drive Data Set number.
NOFSDDS	NOFSDDS defines the number of sending Drive Data Set elements.
NOFRDDS	NOFRDDS defines the number of receiving Drive Data Set elements.

(1) For more description see “Addressing of drive” in *Functional Units Part 8, DRICONS User’s Guide*

– Select **Symbol Kind PU**. Change the values where the defaults are not applicable.

Table 3-6. DRIS3 PU Symbols

Symbol Name	Description
SHOW_SPEED	SHOW_SPEED determines if the actual speed is shown in display elements.
SHOW_CURR	SHOW_CURR determines if actual current is shown in display elements. Default value is 1.
SHOW_TORQUE	SHOW_TORQUE determines if actual torque is shown in display elements. Default value is 0.
SHOW_SP_SPEED_RPM	SHOW_SP_SPEED_RPM determines if the speed setpoint in rpm is shown in display elements. Default value is 0. This should be True if CONTROL_MODE = 0.
SHOW_SP_SPEED_PRC	SHOW_SP_SPEED_PRC determines if the speed setpoint in percentage is shown in display elements. Default value is 1. This should be False if CONTROL_MODE = 0.
SHOW_SP_PID	SHOW_SP_PID determines if the PID setpoint in percentage is shown in display elements. Default value is 0.
SHOW_SP_TORQUE	SHOW_SP_TORQUE determines if the torque setpoint in percentage is shown in display elements. Default value is 0.
SHOW_ARB_VAL	SHOW_ARB_VAL determines if actual arbitrary is shown in display elements. Default value is 0.
CONTROL_MODE	CONTROL_MODE determines the control mode of the drive unit. Default value is 1. This means that one of speed or torque in percentage is sent to the drives unit as reference. 0 means that speed in rpm is sent to the drives unit as reference. A 0 here also requires USE_DIAG = True.
IC_TEXT	IC_TEXT is a description text related to the safety interlock. (1) Default value is "Safety intl".
IB_TEXT1	IB_TEXT1 is a description text related to the operation interlock(1) B1. Default value is "Process intl".
IB_TEXT2	IB_TEXT2 is a description text related to the operation interlock(1) B2. Default value is "Process intl".
IB_TEXT3	IB_TEXT3 is a description text related to the start/operation interlock(1) B3. Default value is "Process intl".
IB_TEXT4	IB_TEXT4 is a description text related to the start/operation interlock(1) B4. Default value is "Process intl".
IA_TEXT	IA_TEXT is a description text related to the operation interlock(1) A. Default value is "Sequence intl".
TORQUE_MAX	TORQUE_MAX is the max. value of actual torque. Default value is 100.

Table 3-6. DRIS3 PU Symbols (Continued)

Symbol Name	Description
TORQUE_MIN	TORQUE_MIN is the min. value of actual torque. Default value is 0.
ARB_VALUE_NAME	ARB_VALUE_NAME determines the name of the arbitrary value. The maximum length is 10 characters. Default value is "X".
ARB_VALUE_MIN	ARB_VALUE_MIN is the min. value of an arbitrary value, can be frequency, power and so on. Which it is, is configured in the drives unit. Default value is 0.
ARB_VALUE_MAX	ARB_VALUE_MAX is the max. value of an arbitrary value, can be frequency, power and so on. Which it is, is configured in the drives unit. Default value is 100.
SPEED_MAX	SPEED_MAX is the max. value of actual speed. Default value is 1500.
SPEED_MIN	SPEED_MIN is the min. value of actual speed. Default value is -1500.
EXT_SP_SPEED_MIN	EXT_SP_SPEED_MIN is the min. value of external speed reference. Default value is -100.
EXT_SP_SPEED_MAX	EXT_SP_SPEED_MAX is the max. value of external speed reference. Default value is 100.
EXT_SP_TORQUE_MIN	EXT_SP_TORQUE_MIN is the min. value of external torque reference. Default value is -100.
EXT_SP_TORQUE_MAX	EXT_SP_TORQUE_MAX is the max. value of external torque reference. Default value is 100.
PERC_SP_SPEED_MAX	PERC_SP_SPEED_MAX is the max. value of speed reference in percentage. Default value is 100.
PERC_SP_SPEED_MIN	PERC_SP_SPEED_MIN is the min. value of speed reference in percentage. Default value is -100.
CURR_MIN	CURR_MIN is the min. value of actual current. Default value is 0.
CURR_MAX	CURR_MAX is the max. value of actual current. Default value is 100.
I1_EVBLK (2)	I1_EVBLK is selection of blocking of events from IND1. Default value is HE1FF.
I2_EVBLK (2)	I2_EVBLK is selection of blocking of events from IND2. Default value is HFFFF.
RP1_CTRL (3)	RP1_CTRL is selection of blocking of repeat failure control of IND1. Default value is HFFFF.

Table 3-6. DRIS3 PU Symbols (Continued)

Symbol Name	Description
RP2_CTRL (3)	RP2_CTRL is selection of blocking of repeat failure control of IND2. Default value is HFFFF.
SPEED_UNIT	SPEED_UNIT is the unit of the speed values. Default value is rpm.
JOG_SPEED	JOG_SPEED is the value in rpm for the jog speed. Default value is 20.
REF2_SCALING	REF2_SCALING is the value of scale factor for reference 2. The reference 2 is used when control mode 2 is selected. The reference 2 can either be a setpoint for speed torque or PID in percentage. Default value is 100.
ABS_SP_SPEED_MIN	ABS_SP_SPEED_MIN is the value of minimum absolute speed setpoint. Default value is -1500.
ABS_SP_SPEED_MAX	ABS_SP_SPEED_MIN is the value of maximum absolute speed setpoint. Default value is 1500.
NOMINAL_CURR	NOMINAL_CURR is the value of nominal current. Default value is 100.
NOMINAL_TORQUE	NOMINAL_TORQUE is the value of nominal torque. Default value is 100.
COMM_ERR_FILT	COMM_ERR_FILT is a time delay to prevent alarms on the operator station due to short interrupts in communication.
USE_DRISTD_SPEEDSF	USE_DRISTD_SPEEDSF defines whether the absolute is going to be scaled with the scale factor in the DRISTD DB element. This parameter is used if the actual speed is presented in rpm. Default value is No.

(1) For more details on interlocking see "Interlock configuration" in *Functional Units Part 8, DRICONS User's Guide*

(2) See MOTCON in *Data Base Elements Advant Controller 400 Series Reference Manual* for a detailed description

(3) See MOTCON in *Data Base Elements Advant Controller 400 Series Reference Manual* for a detailed description

– When all symbols have correct values press **OK** to instantiate the type circuit.

To connect the type circuit do the following:

– Select the terminals, one by one, and connect to constants, data base or other PC Elements. See the User's Guides for your Engineering Station for details.

Table 3-7. DRIS3 Terminals

No	Name	Type	Description
1	**NAME**	I	Drive object name for presentation purpose.
2	**DRNODENR**	I	Drive address for diagnostic purpose.
3	**IC1**	B	Interlock C1. Operation interlock (not deblockable). Default connection is D=1.
4	**IB1**	B	Interlock B1. Operation interlock (1) (2). Default connection is D=1.
5	**IB2**	B	Interlock B2. Operation interlock (2). Default connection is D=1.
6	**IB3**	B	Interlock B3. Start/operation interlock(1) (2). Default connection is D=1.
7	**IB4**	B	Interlock B4. Start/operation interlock(2). Default connection is D=1.
8	**IBF**	B	Interlock B Function. Control input for IB3 and IB4. If IBF is set to 1, IB3 and IB4 works as start interlocks. Default connection is D=0.
9	**IA**	B	Interlock A. Operation interlock(2). Default connection is D=1.
10	**ASTART**	B	Auto Start. The start order is invoked from an other PC-program. The point of control is CENTRAL and AUTO. Default connection is D=0.
11	**ASTOP**	B	Auto Stop. The stop order is invoked from an other PC-program. The point of control is CENTRAL and AUTO. Default connection is D=0.
12	**GSTART**	B	Group Start. The start order is invoked from a group sequence. The point of control is CENTRAL and MAN. Default connection is D=0.
13	**GSTOP**	B	Group Stop. The stop order is invoked from a group sequence. The point of control is CENTRAL and MAN. Default connection is D=0.
14	**LSTART**	B	Local Start. The point of control must be LOCAL. Default connection is D=0.
15	**LSTOP**	B	Local Stop. The point of control must be LOCAL. Default connection is D=0.
16	**JOGPBFW**	B	JOG Push-button ForWard direction. The point of control must be JOG. Default connection is D=0.
17	**JOGPBREV**	B	JOG Push-button REVerse direction. The point of control must be JOG. Default connection is D=0.

Table 3-7. DRIS3 Terminals (Continued)

No	Name	Type	Description
18	**CTRLMODE**	B	ConTRoL MODE selection. Value of 0 control mode 1: reference 1 is used. Value of 1 control mode 2: reference 2 is used. Default connection is D=1. This terminal is only available when USE_DIAG=1.
19	**ERROR**	B	ERROR from drive or communication error.
20	**READY**	B	Drive is READY and no interlocks.
21	**RUN**	B	Drive is RUNning.
22	**MAN**	B	Drive is in MANual mode.
23	**AUTO**	B	Drive is in AUTO mode.
24	**CENTRAL**	B	Point of control is CENTRAL. The drive is control from the Operator Station or via PC-program sequence.
25	**LOCAL**	B	Point of control is LOCAL. The drive is controlled from a local panel.
26	**JOG**	B	Point of control is JOG.
27	**STANDBY**	B	Point of control is STANDBY. The drive is put out of service.
28	**DRLOCAL**	B	Point of control is Drive Local. The control is done from the local drive panel.
29	**ESPDSP1**	R	Value of External SPeeD SetPoint1. The external speed reference is given in rpm. Default connection is D=0. This terminal is only available when USE_DIAG=1.
30	**ESPDSP2**	R	Value of External SPeeD SetPoint1. The external speed reference is given in%. Default connection is D=0.
31	**TQEXTREF**	R	Value of EXTernal TorQue REFerence. The external torque reference is given in%. Default connection is D=0.
32	**ASPEED**	R	Actual SPEED
33	**ATORQUE**	R	Actual TORQUE

(1) May be disabled via operator dialog.
(2) Disabled in operation mode JOG.

3.6.2 DRIE4

To create application programs using DRIE4 is done in two major steps:

- Instantiate the type circuit.
- Connect the terminals on the instantiated type circuit.

To instantiate the type circuit do the following:

- Select the PC element (or instantiated type circuit or located circuit), below or behind (depending of level) which you want to insert the new PC element (or type circuit or circuit).
- Choose the Edit | Create command.
- Select **TC** in **Element Type**.
- Select DRIE4_A0 and press the button **Symbol Values...**.
- In the first dialog box, you enter the values for which of the variants below you want to use.

Table 3-8. DRIE4 Variants

Variant Name	Description
USE_FAULT	True: Creates an additional MMCX data base element for storing fault information from the drive. This data base element is also needed for speed setpoint values in rpm. False: Does not create an additional MMCX data base element. Default value is 1.
USE_ALARM	True: Creates an additional MMCX data base element for storing alarm information from the drive. False: Does not create an additional MMCX data base element. Default value is 1

- Now a second dialog box appear
- **Symbol Kind IU** is selected by default. Those that do not have default values must be given valid values here.

Table 3-9. DRIE4 IU Symbols

Symbol Name	Description
DRIVE_NAME	DRIVE_NAME is the name of this particular drive object. The maximum length is 13 characters. The following characters can be used throughout the Advant System (see AdvaCommand Basic Functions, Section 5.1.5.9 Check for Valid Input): ’0’ - ’9’, ’a’ - ’z’, ’A’ - ’Z’, ’-’, ’_’, ’.’.
	In addition the set of national characters is allowed. These characters are equivalent to the 7-bit ASCII characters ’@’, ’^’, ’[’, ’\’, ’]’, ’‘’, ’{’, ’|’, ’}’, ’~’.
DESCRIPTION	DESCRIPTION is a descriptive text used for operator presentation. The maximum length is 20 characters.

Table 3-9. DRIE4 IU Symbols (Continued)

Symbol Name	Description
BUS (1)	BUS is the number of the bus connected to the I/O station for the actual drive.
STATION (1)	STATION is a positive number 1 - 79 of the I/O station
POSITION (1)	POSITION is a positive number (101 - 112), (201 - 212) - (701 - 712)
IOSCANT1	Fieldbus **I**nput **O**utput **SCAN T**ime **1** used for fast send and receive data to/from the drive. The IOSCANT1 refers to the Drive Data Sets 10 - 19. Allowed values in ms: 1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048, 4096
IOSCANT2	Fieldbus **I**nput **O**utput **SCAN T**ime **2** used for slow send and receive data to/from the drive. The IOSCANT1 refers to the Drive Data Sets 20 - 28. Allowed values in ms: 1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048, 4096
PROC_SEC	PROC_SEC is the process section number used for alarm and event treatment. Valid values are -1 - 16.
CLASS	CLASS subdivides process section. Used by status list function in Operator Station. Default value is 0.
NOMINAL_CURR	NOMINAL_CURR is the value of the nominal current of the drive.
NOMINAL_TORQUE	NOMINAL_TORQUE is the value of the nominal torque of the drive.
FIRSTDDS	FIRSTDDS defines the first Drive Data Set number.
NOFSDDS	NOFSDDS defines the number of sending Drive Data Set elements.
NOFRDDS	NOFRDDS defines the number of receiving Drive Data Set elements.

(1) For more description see "Addressing of drive" in *Functional Units Part 9, DRICONE User's Guide*

– Select **Symbol Kind PU**. Change the values where the defaults are not applicable.

Table 3-10. DRIE4 PU Symbols

Symbol Name	Description
SHOW_SPEED	SHOW_SPEED determines if actual speed is shown in display elements. Default value is 1.
SHOW_CURR	SHOW_CURR determines if actual current is shown in display elements. Default value is 1.
SHOW_TORQUE	SHOW_TORQUE determines if actual torque is shown in display elements. Default value is 0.
SHOW_ARB_VAL	SHOW_ARB_VAL determines if actual arbitrary is shown in display elements. Default value is 0.

Table 3-10. DRIE4 PU Symbols (Continued)

Symbol Name	Description
SHOW_SP_SPEED_RPM	SHOW_SP_SPEED_RPM determines if the speed setpoint in rpm is shown in display elements. Default value is 0. This should be True if CONTROL_MODE = 0.
SHOW_SP_SPEED_PRC	SHOW_SP_SPEED_PRC determines if the speed setpoint in percentage is shown in display elements. Default value is 1. This should be False if CONTROL_MODE = 0.
SHOW_SP_PID	SHOW_SP_PID determines if the PID setpoint in percentage is shown in display elements. Default value is 0.
SHOW_SP_TORQUE	SHOW_SP_TORQUE determines if the torque setpoint in percentage is shown in display elements. Default value is 0.
CONTROL_MODE	CONTROL_MODE determines the control mode of the drive unit. 0 means that the drive is controlled by speed setpoint. 1 means that the drive is controlled by torque setpoint. Default value is 0.
SPEED_REF_MODE	SPEED_REF_MODE determines whether the reference is given in percentage or rpm. 0 means that the speed in percentage is given as reference. 1 means that the speed in rpm is given as reference. Default value is 0.
SAFETY_INTL_TEXT	SAFETY_INTL_TEXT is a description text related to the safety interlock(1). Default value is "Safety intl".
PROCESS_INTL_TEXT1	PROCESS_INTL_TEXT1 is a description text related to the operation interlock(1) B1. Default value is "Process intl".
PROCESS_INTL_TEXT2	PROCESS_INTL_TEXT2 is a description text related to the operation interlock(1) B2. Default value is "Process intl".
PROCESS_INTL_TEXT3	PROCESS_INTL_TEXT3 is a description text related to the start/operation interlock(1) B3. Default value is "Process intl".
PROCESS_INTL_TEXT4	PROCESS:INTL_TEXT4 is a description text related to the start/operation interlock(1) B4. Default value is "Process intl".
SEQUENCE_INTL_TEXT	SEQUENCE_INTL_TEXT is a description text related to the operation interlock(1) A. Default value is "Sequence intl".
TORQUE_MAX	TORQUE_MAX is the max. value of actual torque. Default value is 100.
TORQUE_MIN	TORQUE_MIN is the min. value of actual torque. Default value is 0.
ARB_VALUE_NAME	ARB_VALUE_NAME determines the name of the arbitrary value. The maximum length is 10 characters. Default value is "X".
ARB_VALUE_MIN	ARB_VALUE_MIN is the min. value of an arbitrary value, can be frequency, power etc. What it represents, is configured in the drive unit. Default value is 0.

Table 3-10. DRIE4 PU Symbols (Continued)

Symbol Name	Description
ARB_VALUE_MAX	ARB_VALUE_MAX is the max. value of an arbitrary value, can be frequency, power and so on. Which it is, is configured in the drives unit. Default value is 100.
SPEED_MAX	SPEED_MAX is the max. value of actual speed. Default value is 1500.
SPEED_MIN	SPEED_MIN is the min. value of actual speed. Default value is -1500.
EXT_SP_SPEED_MIN	EXT_SP_SPEED_MIN is the min. value of external speed reference. Default value is -100.
EXT_SP_SPEED_MAX	EXT_SP_SPEED_MAX is the max. value of external speed reference. Default value is 100.
EXT_SP_TORQUE_MIN	EXT_SP_TORQUE_MIN is the min. value of external torque reference. Default value is -100.
EXT_SP_TORQUE_MAX	EXT_SP_TORQUE_MAX is the max. value of external torque reference. Default value is 100.
PERC_SP_SPEED_MAX	PERC_SP_SPEED_MAX is the max. value of speed reference in percentage. Default value is 100.
PERC_SP_SPEED_MIN	PERC_SP_SPEED_MIN is the min. value of speed reference in percentage. Default value is -100.
CURR_MIN	CURR_MIN is the min. value of actual current. Default value is 0.
CURR_MAX	CIRR_MAX is the max. value of actual current in percentage. Default value is 100.
HIGH_CURR_LOAD	HIGH_CURR_LOAD is the highest limit used by PC for limit check of the motor current.
NORM_CURR_LOAD	NORM_CURR_LOAD is the lowest limit used by PC for limit check of the motor current.
I1_EVBLK (2)	I1_EVBLK is selection of blocking of events from IND1in main object. Default value is H'E1FF.
I2_EVBLK (2)	I2_EVBLK is selection of blocking of events from IND2 in main object. Default value is H'FFFF.
FAULT_OBJ_I1_EVBLK (2)	I1_EVBLK is selection of blocking of events from IND1in fault object. Default value is H'0000.
FAULT_OBJ_I2_EVBLK (2)	I2_EVBLK is selection of blocking of events from IND2 in fault object. Default value is H'0000.

Table 3-10. DRIE4 PU Symbols (Continued)

Symbol Name	Description
ALARM_OBJ_I1_EVBLK (2)	I1_EVBLK is selection of blocking of events from IND1in alarm object. Default value is H'FFFF.
ALARM_OBJ_I2_EVBLK (2)	I2_EVBLK is selection of blocking of events from IND2 in alarm object. Default value is H'FFFF.
RP1_CTRL (3)	RP1_CTRL is selection of blocking of repeat failure control of IND1. Default value is HFFFF.
RP2_CTRL (3)	RP2_CTRL is selection of blocking of repeat failure control of IND2. Default value is HFFFF.
SPEED_AND_ARB_UNIT	SPEED_AND_ARB_UNIT is the units of the speed value and the arbitrary value. Character 1 - 5 represents the speed unit and character 6 - 10 represents the arbitrary value unit. Default value is "%" and "X".
JOG_SPEED	JOG_SPEED is the value in rpm for the jog speed. Default value is 20.
USE_DRIENG_SPEEDSF	USE_DRIENG_SPEEDSF defines whether the absolute speed is going to be scaled with the scale factor in the DRISTD DB element. This parameter is used if the actual speed is presented in rpm. Default value is No.
CURR_SCALING	CURR_SCALING defines the value for 1A in the drive system. Default value is 10.
ABS_SP_SPEED_MIN	ABS_SP_SPEED_MIN is the value of minimum absolute speed setpoint. Default value is -1500.
ABS_SP_SPEED_MAX	ABS_SP_SPEED_MIN is the value of maximum absolute speed setpoint. Default value is 1500.
IS_DCS	IS_DCS defines if the drive is an AC or DC drive system. 0 = AC Drive. 1 = DC Drive. Default value is 0.

(1) For more details on interlocking see "Interlock configuration" in *Functional Units Part 8, DRICONS User's Guide.*

(2) For more description see "Addressing of drive" in *Functional Units Part 9, DRICONE User's Guide*

(3) See MOTCON in *Data Base Elements Advant Controller 400 Series Reference Manual* for a detailed description

– When all symbols have correct values press **OK** to instantiate the type circuit.

To connect the type circuit do the following:

– Select the terminals, one by one, and connect to constants, data base or other PC Elements. See the User's Guides for your Engineering Station for details.

Table 3-11. DRIE4 Terminals

No	Name	Type	Description
1	**NAME**	I	Drive object name for presentation purpose.
2	**DRNODENR**	I	Drive address for diagnostic purpose.
3	**IC1**	B	Interlock C1. Operation interlock (not deblockable). Default connection is D=1.
4	**IB1**	B	Interlock B1. Operation interlock (1) (2). Default connection is D=1.
5	**IB2**	B	Interlock B2. Operation interlock (2). Default connection is D=1.
6	**IB3**	B	Interlock B3. Start/operation interlock(1) (2). Default connection is D=1.
7	**IB4**	B	Interlock B4. Start/operation interlock(2). Default connection is D=1.
8	**IBF**	B	Interlock B Function. Control input for IB3 and IB4. If IBF is set to 1, IB3 and IB4 works as start interlocks. Default connection is D=0.
9	**IA**	B	Interlock A. Operation interlock(2). Default connection is D=1.
10	**ASTART**	B	Auto Start. The start order is invoked from an other PC-program. The point of control is CENTRAL and AUTO. Default connection is D=0.
11	**ASTOP**	B	Auto Stop. The stop order is invoked from an other PC-program. The point of control is CENTRAL and AUTO. Default connection is D=0.
12	**GSTART**	B	Group Start. The start order is invoked from a group sequence. The point of control is CENTRAL and MAN. Default connection is D=0.
13	**GSTOP**	B	Group Stop. The stop order is invoked from a group sequence. The point of control is CENTRAL and MAN. Default connection is D=0.
14	**LSTART**	B	Local Start. The point of control must be LOCAL. Default connection is D=0.
15	**LSTOP**	B	Local Stop. The point of control must be LOCAL. Default connection is D=0.
16	**JOGPBFW**	B	JOG Push-button ForWard direction. The point of control must be JOG. Default connection is D=0.
17	**JOGPBREV**	B	JOG Push-button REVerse direction. The point of control must be JOG. Default connection is D=0.

Table 3-11. DRIE4 Terminals (Continued)

No	Name	Type	Description
18	**CTRLMODE**	B	ConTRoL MODE selection. Value of 0 control mode 1: reference 1 is used. Value of 1 control mode 2: reference 2 is used. Default connection is D=1. This terminal is only available when USE_FAULT_IND=1.
19	**ERROR**	B	ERROR from drive or communication error.
20	**READY**	B	Drive is READY and no interlocks.
21	**RUN**	B	Drive is RUNning.
22	**MAN**	B	Drive is in MANual mode.
23	**AUTO**	B	Drive is in AUTO mode.
24	**CENTRAL**	B	Point of control is CENTRAL. The drive is control from the Operator Station or via PC-program sequence.
25	**LOCAL**	B	Point of control is LOCAL. The drive is controlled from a local panel.
26	**JOG**	B	Point of control is JOG.
27	**STANDBY**	B	Point of control is STANDBY. The drive is put out of service.
28	**DRLOCAL**	B	Point of control is Drive Local. The control is done from the local drive panel.
29	**ESPDSP1**	R	Value of External SPeeD SetPoint1. The external speed reference is given in rpm. Default connection is D=0. This terminal is only available when USE_FAULT_IND=1.
30	**ESPDSP2**	R	Value of External SPeeD SetPoint1. The external speed reference is given in%. Default connection is D=0.
31	**ETQSP**	R	Value of External TorQue SetPoint. The external torque setpoint is given in %. Default connection is D=0.
32	**ASPEED**	R	Actual SPEED
33	**ATORQUE**	R	Actual TORQUE
34	**OFF2**	B	OFF2 determines if the Emergency is off or not. Default connection is D=1, which means that the Emergency is off.
35	**OFF3**	B	OFF3 determines if the Emergency stop is off or not. Default connection is D=1, which means that the Emergency stop is off.

Table 3-11. DRIE4 Terminals (Continued)

No	Name	Type	Description
36	**SPRFMODE**	B	SPEED_REF_MODE determines whether the reference is given in percentage or rpm. Default connection is D=0. This means that the speed reference in percentage is used. 1 means that the speed reference in rpm is used.
37	**RMPOUT0**	B	RaMP OUTput to 0. 0=Ramp function output is zero. 1=Operating condition. Default connection is D=1.
38	**RMPHOLD**	B	The speed RaMPing is stopped. 0=Freeze the actual setpoint from the ramp function generator. 1=Enable ramp function generator. Default connection is D=1.
39	**RMPIN0**	B	RaMP INput to 0. 0=Speed ramp input is forced to zero. 1=Enable setpoint. Default connection is D=1.
40	**INCHING1**	B	The drive accelerates as fast as possible to INCHING setpoint 1. Default connection is D=0.
41	**INCHING2**	B	The drive accelerates as fast as possible to INCHING setpoint 2. Default connection is D=0.
42	**REMCMD**	B	REMote COMmand. 0=Reference values are frizzed. 1=Reference values can be changed by the control system. Default connection is d=1.

(1) May be disabled via operator dialog.
(2) Disabled in operation mode JOG.

3.6.3 DRID1

To create application programs using DRID1 is done in two major steps:

- Instantiate the type circuit.
- Connect the terminals on the instantiated type circuit.

To instantiate the type circuit do the following:

- Select the PC element (or instantiated type circuit or located circuit), below or behind (depending of level) which you want to insert the new PC element (or type circuit or circuit).
- Choose the Edit | Create command.
- Select **TC** in **Element Type**.
- Select DRID1_A0 and press the button **Symbol Values...**.
- In the first dialog box, you enter the values for which of the variants below you want to use.

Table 3-12. DRID1 Variants

Variant Name	Description
USE_FAULT	True: Creates an additional MMCX data base element for storing fault information from the drive. This data base element is also needed for speed setpoint values in rpm False: Does not create an additional MMCX data base element. Default value is 1.
USE_ALARM	True: Creates an additional MMCX data base element for storing alarm information from the drive. False: Does not create an additional MMCX data base element. Default value is 1

- – Now a second dialog box appear
- – **Symbol Kind IU** is selected by default. Those that do not have default values must be given valid values here.

Table 3-13. DRID1 IU Symbols

Symbol Name	Description
DRIVE_NAME	DRIVE_NAME is the name of this particular drive object. The maximum length is 13 characters. The following characters can be used throughout the Advant System (see AdvaCommand Basic Functions, Section 5.1.5.9 Check for Valid Input): ’0’ - ’9’, ’a’ - ’z’, ’A’ - ’Z’, ’-’, ’_’, ’.’.
	In addition the set of national characters is allowed. These characters are equivalent to the 7-bit ASCII characters ’@’, ’^’, ’[’, ’\’, ’]’, ’‘’, ’{’, ’|’, ’}’, ’~’.
DESCRIPTION	DESCRIPTION is a descriptive text used for operator presentation. The maximum length is 20 characters.
BUS (1)	BUS is the number of the bus connected to the I/O station for the actual drive.
STATION (1)	STATION is a positive number 1 - 79 of the I/O station
POSITION (1)	POSITION is a positive number (101 - 112), (201 - 212) - (701 - 712)
IOSCANT1	Fieldbus **I**nput **O**utput **SCAN T**ime **1** used for fast send and receive data to/from the drive. The IOSCANT1 refers to the Drive Data Sets 10 - 19. Allowed values in ms: 1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048, 4096
IOSCANT2	Fieldbus **I**nput **O**utput **SCAN T**ime **2** used for slow send and receive data to/from the drive. The IOSCANT1 refers to the Drive Data Sets 20 - 28. Allowed values in ms: 1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048, 4096
PROC_SEC	PROC_SEC is the process section number used for alarm and event treatment. Valid values are -1 - 16.

Table 3-13. DRID1 IU Symbols (Continued)

Symbol Name	Description
CLASS	CLASS subdivides process section. Used by status list function in Operator Station. Default value is 0.
NOMINAL_CURR	NOMINAL_CURR is the value of the nominal current of the drive.
NOMINAL_TORQUE	NOMINAL_TORQUE is the value of the nominal torque of the drive.
FIRSTDDS	FIRSTDDS defines the first Drive Data Set number.
NOFSDDS	NOFSDDS defines the number of sending Drive Data Set elements.
NOFRDDS	NOFRDDS defines the number of receiving Drive Data Set elements.

(1) For more description see "Addressing of drive" in *Functional Units Part 9, DRICONE User's Guide*

– Select **Symbol Kind PU**. Change the values where the defaults are not applicable.

Table 3-14. DRID1 PU Symbols

Symbol Name	Description
SHOW_SPEED	SHOW_SPEED determines if actual speed is shown in display elements. Default value is 1.
SHOW_CURR	SHOW_CURR determines if actual current is shown in display elements. Default value is 1.
SHOW_TORQUE	SHOW_TORQUE determines if actual torque is shown in display elements. Default value is 0.
SHOW_ARB_VAL	SHOW_ARB_VAL determines if actual arbitrary is shown in display elements. Default value is 0.
SHOW_SP_SPEED_RPM	SHOW_SP_SPEED_RPM determines if the speed setpoint in rpm is shown in display elements. Default value is 0. This should be True if CONTROL_MODE = 0.
SHOW_SP_SPEED_PRC	SHOW_SP_SPEED_PRC determines if the speed setpoint in percentage is shown in display elements. Default value is 1. This should be False if CONTROL_MODE = 0.
SHOW_SP_TORQUE	SHOW_SP_TORQUE determines if the torque setpoint in percentage is shown in display elements. Default value is 0.
CONTROL_MODE	CONTROL_MODE determines the control mode of the drive unit. 0 means that the drive is controlled by speed setpoint. 1 means that the drive is controlled by torque setpoint. Default value is 0.
SPEED_REF_MODE	SPEED_REF_MODE determines weather the reference is given in percentage or rpm. 0 means that the speed in percentage is given as reference. 1 means that the speed in rpm is given as reference. Default value is 0.

Table 3-14. DRID1 PU Symbols (Continued)

Symbol Name	Description
SAFETY_INTL_TEXT	SAFETY_INTL_TEXT is a description text related to the safety interlock(1). Default value is "Safety intl".
PROCESS_INTL_TEXT1	PROCESS_INTL_TEXT1 is a description text related to the operation interlock(1) B1. Default value is "Process intl".
PROCESS_INTL_TEXT2	PROCESS_INTL_TEXT2 is a description text related to the operation interlock(1) B2. Default value is "Process intl".
PROCESS_INTL_TEXT3	PROCESS_INTL_TEXT3 is a description text related to the start/operation interlock(1) B3. Default value is "Process intl".
PROCESS_INTL_TEXT4	PROCESS:INTL_TEXT4 is a description text related to the start/operation interlock(1) B4. Default value is "Process intl".
SEQUENCE_INTL_TEXT	SEQUENCE_INTL_TEXT is a description text related to the operation interlock(1) A. Default value is "Sequence intl".
TORQUE_MAX	TORQUE_MAX is the max. value of actual torque. Default value is 100.
TORQUE_MIN	TORQUE_MIN is the min. value of actual torque. Default value is 0.
ARB_VALUE_NAME	ARB_VALUE_NAME determines the name of the arbitrary value. The maximum length is 10 characters. Default value is "X".
ARB_VALUE_MIN	ARB_VALUE_MIN is the min. value of an arbitrary value, can be frequency, power etc. What it represents, is configured in the drive unit. Default value is 0.
ARB_VALUE_MAX	ARB_VALUE_MAX is the max. value of an arbitrary value, can be frequency, power and so on. Which it is, is configured in the drives unit. Default value is 100.
SPEED_MAX	SPEED_MAX is the max. value of actual speed. Default value is 1500.
SPEED_MIN	SPEED_MIN is the min. value of actual speed. Default value is -1500.
EXT_SP_SPEED_MIN	EXT_SP_SPEED_MIN is the min. value of external speed reference. Default value is -100.
EXT_SP_SPEED_MAX	EXT_SP_SPEED_MAX is the max. value of external speed reference. Default value is 100.
EXT_SP_TORQUE_MIN	EXT_SP_TORQUE_MIN is the min. value of external torque reference. Default value is -100.
EXT_SP_TORQUE_MAX	EXT_SP_TORQUE_MAX is the max. value of external torque reference. Default value is 100.

Table 3-14. DRID1 PU Symbols (Continued)

Symbol Name	Description
PERC_SP_SPEED_MAX	PERC_SP_SPEED_MAX is the max. value of speed reference in percentage. Default value is 100.
PERC_SP_SPEED_MIN	PERC_SP_SPEED_MIN is the min. value of speed reference in percentage. Default value is -100.
CURR_MIN	CURR_MIN is the min. value of actual current. Default value is 0.
CURR_MAX	CIRR_MAX is the max. value of actual current in percentage. Default value is 100.
HIGH_CURR_LOAD	HIGH_CURR_LOAD is the highest limit used by PC for limit check of the motor current.
NORM_CURR_LOAD	NORM_CURR_LOAD is the lowest limit used by PC for limit check of the motor current.
I1_EVBLK (2)	I1_EVBLK is selection of blocking of events from IND1in main object. Default value is H'E1FF.
I2_EVBLK (2)	I2_EVBLK is selection of blocking of events from IND2 in main object. Default value is H'FFFF.
FAULT_OBJ_I1_EVBLK (2)	I1_EVBLK is selection of blocking of events from IND1in fault object. Default value is H'0000.
FAULT_OBJ_I2_EVBLK (2)	I2_EVBLK is selection of blocking of events from IND2 in fault object. Default value is H'0000.
ALARM_OBJ_I1_EVBLK (2)	I1_EVBLK is selection of blocking of events from IND1in alarm object. Default value is H'FFFF.
ALARM_OBJ_I2_EVBLK (2)	I2_EVBLK is selection of blocking of events from IND2 in alarm object. Default value is H'FFFF.
RP1_CTRL (3)	RP1_CTRL is selection of blocking of repeat failure control of IND1. Default value is HFFFF.
RP2_CTRL (3)	RP2_CTRL is selection of blocking of repeat failure control of IND2. Default value is HFFFF.
SPEED_AND_ARB_UNIT	SPEED_AND_ARB_UNIT is the units of the speed value and the arbitrary value. Character 1 - 5 represents the speed unit and character 6 - 10 represents the arbitrary value unit. Default value is "%" and "X".
JOG_SPEED	JOG_SPEED is the value in rpm for the jog speed. Default value is 20.
USE_DRIENG_SPEEDSF	USE_DRIENG_SPEEDSF defines whether the absolute speed is going to be scaled with the scale factor in the DRISTD DB element. This parameter is used if the actual speed is presented in rpm. Default value is No.

Table 3-14. DRID1 PU Symbols (Continued)

Symbol Name	Description
CURR_SCALING	CURR_SCALING defines the value for 1A in the drive system. Default value is 10.
ABS_SP_SPEED_MIN	ABS_SP_SPEED_MIN is the value of minimum absolute speed setpoint. Default value is -1500.
ABS_SP_SPEED_MAX	ABS_SP_SPEED_MIN is the value of maximum absolute speed setpoint. Default value is 1500.
ACT_CURRENT_DDS	Actual current DDS. Default value is 4.
ACT_CURRENT_TERM	Actual current terminal. Default value is 3.
ACT_TORQUE_DDS	Actual torque DDS. Default value is 2.
ACT_TORQUE_TERM	Actual torque terminal. Default value is 3.
USE_ARB_VAL	Defines if the arbitrarily value is used. Default value is 0.
ACT_ARB_VAL_DDS	Actual arbitrarily value DDS. Default value is 0.
ACT_ARB_VAL_TERM	Actual current terminal. Default value is 0.
FAULT_WORD_DDS	Fault word DDS. Default value is 4.
FAULT_WORD_TERM	Fault word terminal. Default value is 1.
ALARM_WORD_DDS	Alarm word DDS. Default value is 4.
ALARM_WORD_TERM	Alarm word terminal. Default value is 2.

(1) For more details on interlocking see "Interlock configuration" in *Functional Units Part 8, DRICONS User's Guide*

(2) See MOTCON in *Data Base Elements Advant Controller 400 Series Reference Manual* for a detailed description

(3) See MOTCON in *Data Base Elements Advant Controller 400 Series Reference Manual* for a detailed description

- When all symbols have correct values press **OK** to instantiate the type circuit.

To connect the type circuit do the following:

- Select the terminals, one by one, and connect to constants, data base or other PC Elements. See the User's Guides for your Engineering Station for details.

Table 3-15. DRID1 Terminals

No	Name	Type	Description
1	**NAME**	I	Drive object name for presentation purpose.
2	**DRNODENR**	I	Drive address for diagnostic purpose.
3	**IC1**	B	Interlock C1. Operation interlock (not deblockable). Default connection is D=1.
4	**IB1**	B	Interlock B1. Operation interlock (1) (2). Default connection is D=1.
5	**IB2**	B	Interlock B2. Operation interlock (2). Default connection is D=1.
6	**IB3**	B	Interlock B3. Start/operation interlock(1) (2). Default connection is D=1.
7	**IB4**	B	Interlock B4. Start/operation interlock(2). Default connection is D=1.
8	**IBF**	B	Interlock B Function. Control input for IB3 and IB4. If IBF is set to 1, IB3 and IB4 works as start interlocks. Default connection is D=0.
9	**IA**	B	Interlock A. Operation interlock(2). Default connection is D=1.
10	**ASTART**	B	Auto Start. The start order is invoked from an other PC-program. The point of control is CENTRAL and AUTO. Default connection is D=0.
11	**ASTOP**	B	Auto Stop. The stop order is invoked from an other PC-program. The point of control is CENTRAL and AUTO. Default connection is D=0.
12	**GSTART**	B	Group Start. The start order is invoked from a group sequence. The point of control is CENTRAL and MAN. Default connection is D=0.
13	**GSTOP**	B	Group Stop. The stop order is invoked from a group sequence. The point of control is CENTRAL and MAN. Default connection is D=0.
14	**LSTART**	B	Local Start. The point of control must be LOCAL. Default connection is D=0.
15	**LSTOP**	B	Local Stop. The point of control must be LOCAL. Default connection is D=0.
16	**JOGPBFW**	B	JOG Push-button ForWard direction. The point of control must be JOG. Default connection is D=0.
17	**JOGPBREV**	B	JOG Push-button REVerse direction. The point of control must be JOG. Default connection is D=0.

Table 3-15. DRID1 Terminals (Continued)

No	Name	Type	Description
18	**CTRLMODE**	B	ConTRoL MODE selection. Value of 0 control mode 1: reference 1 is used. Value of 1 control mode 2: reference 2 is used. Default connection is D=1. This terminal is only available when USE_FAULT_IND=1.
19	**ERROR**	B	ERROR from drive or communication error.
20	**READY**	B	Drive is READY and no interlocks.
21	**RUN**	B	Drive is RUNning.
22	**MAN**	B	Drive is in MANual mode.
23	**AUTO**	B	Drive is in AUTO mode.
24	**CENTRAL**	B	Point of control is CENTRAL. The drive is control from the Operator Station or via PC-program sequence.
25	**LOCAL**	B	Point of control is LOCAL. The drive is controlled from a local panel.
26	**JOG**	B	Point of control is JOG.
27	**STANDBY**	B	Point of control is STANDBY. The drive is put out of service.
28	**DRLOCAL**	B	Point of control is Drive Local. The control is done from the local drive panel.
29	**ESPDSP1**	R	Value of External SPeeD SetPoint1. The external speed reference is given in rpm. Default connection is D=0. This terminal is only available when USE_FAULT_IND=1.
30	**ESPDSP2**	R	Value of External SPeeD SetPoint1. The external speed reference is given in%. Default connection is D=0.
31	**ETQSP**	R	Value of External TorQue SetPoint. The external torque setpoint is given in %. Default connection is D=0.
32	**ASPEED**	R	Actual SPEED
33	**ATORQUE**	R	Actual TORQUE
35	**OFF3**	B	OFF3 determines if the Emergency stop is off or not. Default connection is D=1, which means that the Emergency stop is off.
36	**SPRFMODE**	B	SPEED_REF_MODE determines whether the reference is given in percentage or rpm. Default connection is D=0. This means that the speed reference in percentage is used. 1 means that the speed reference in rpm is used.

Table 3-15. DRID1 Terminals (Continued)

No	Name	Type	Description
37	**RMPOUT0**	B	RaMP OUTput to 0. 0=Ramp function output is zero. 1=Operating condition. Default connection is D=1.
38	**RMPHOLD**	B	The speed RaMPing is stopped. 0=Freeze the actual setpoint from the ramp function generator. 1=Enable ramp function generator. Default connection is D=1.
39	**RMPIN0**	B	RaMP INput to 0. 0=Speed ramp input is forced to zero. 1=Enable setpoint. Default connection is D=1.
42	**REMCMD**	B	REMote COMmand. 0=Reference values are frizzed. 1=Reference values can be changed by the control system. Default connection is d=1.

(1) May be disabled via operator dialog.
(2) Disabled in operation mode JOG.

3.6.4 DRIS5

To create application programs using DRIS5 is done in two major steps:

- Instantiate the type circuit.
- Connect the terminals on the instantiated type circuit.

To instantiate the type circuit do the following:

- Select the PC element (or instantiated type circuit or located circuit), below or behind (depending of level) which you want to insert the new PC element (or type circuit or circuit).
- Choose the Edit | Create command.
- Select **TC** in **Element Type**.
- Select DRIS5_A0 and press the button **Symbol Values...**.
- In the first dialog box, you enter the values for which of the variants below you want to use.

Table 3-16. DRIS5 Variants

Variant Name	Description
USE_ENG_PRES	True: The engineered variant of the OS presentation is used. False: The standard variant of the OS presentation is used. Default value is 0.
USE_DIAG	True: Creates an additional MMCX data base element for storing diagnostic information from the drive. This database element is also needed for speed setpoint in rpm. False: Does not create an additional MMCX data base element. Default value 1. Note: This symbol is ignored if USE_ENG_PRES is set to one.
USE_FAULT_IND	True: Creates an additional MMCX data base element for storing fault information from the drive. This data base element is also needed for speed setpoint values in rpm. False: Does not create an additional MMCX data base element. Default value is 1. Note: This symbol is ignored if USE_ENG_PRES is set to zero.
USE_ALARM_IND	True: Creates an additional MMCX data base element for storing alarm information from the drive. False: Does not create an additional MMCX data base element. Default value is 1 Note: This symbol is ignored if USE_ENG_PRES is set to zero.

- Now a second dialog box appear
- **Symbol Kind IU** is selected by default. Those that do not have default values must

be given valid values here.

Table 3-17. DRIS5 IU Symbols

Symbol Name	Description
DRIVE_NAME	DRIVE_NAME is the name of this particular drive object. The maximum length is 13 characters. The following characters can be used throughout the Advant System (see AdvaCommand Basic Functions, Section 5.1.5.9 Check for Valid Input): ’0’ - ’9’, ’a’ - ’z’, ’A’ - ’Z’, ’-’, ’_’, ’.’.
	In addition the set of national characters is allowed. These characters are equivalent to the 7-bit ASCII characters ’@’, ’^’, ’[’, ’\’, ’]’, ’‘’, ’{’, ’|’, ’}’, ’~’.
DESCRIPTION	DESCRIPTION is a descriptive text used for operator presentation. The maximum length is 20 characters.
BUS (1)	BUS is the number of the bus connected to the I/O station for the actual drive.
STATION (1)	STATION is a positive number 1 - 79 of the I/O station
POSITION (1)	POSITION is a positive number (101 - 112), (201 - 212) - (701 - 712)
IOSCANT	Fieldbus **I**nput **O**utput **SCAN T**ime used for fast send and receive data to/from the drive. The IOSCANT refers to the Drive Data Sets 10 - 19. Allowed values in ms: 1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048, 4096
PROC_SEC	PROC_SEC is the process section number used for alarm and event treatment. Valid values are -1 - 16.
CLASS	CLASS subdivides process section. Used by status list function in Operator Station. Default value is 0.
NOMINAL_CURR	NOMINAL_CURR is the value of the nominal current of the drive.
NOMINAL_TORQUE	NOMINAL_TORQUE is the value of the nominal torque of the drive.
FIRSTDDS	FIRSTDDS defines the first Drive Data Set number.
NOFSDDS	NOFSDDS defines the number of sending Drive Data Set elements.
NOFRDDS	NOFRDDS defines the number of receiving Drive Data Set elements.

(1) For more description see “Addressing of drive” in *Functional Units Part 9, DRICONS User’s Guide*

– Select **Symbol Kind PU**. Change the values where the defaults are not applicable.

Table 3-18. DRIS5 PU Symbols

Symbol Name	Description
SHOW_SPEED	SHOW_SPEED determines if actual speed is shown in display elements. Default value is 1.
SHOW_CURR	SHOW_CURR determines if actual current is shown in display elements. Default value is 1.
SHOW_TORQUE	SHOW_TORQUE determines if actual torque is shown in display elements. Default value is 0.
SHOW_ARB_VAL	SHOW_ARB_VAL determines if actual arbitrary is shown in display elements. Default value is 0.
SHOW_SP_SPEED_RPM	SHOW_SP_SPEED_RPM determines if the speed setpoint in rpm is shown in display elements. Default value is 0. This should be True if CONTROL_MODE = 0.
SHOW_SP_SPEED_PRC	SHOW_SP_SPEED_PRC determines if the speed setpoint in percentage is shown in display elements. Default value is 1. This should be False if CONTROL_MODE = 0.
SHOW_SP_PID	SHOW_SP_PID determines if the PID setpoint in percentage is shown in display elements. Default value is 0.
SHOW_SP_TORQUE	SHOW_SP_TORQUE determines if the torque setpoint in percentage is shown in display elements. Default value is 0.
CONTROL_MODE	CONTROL_MODE determines the control mode of the drive unit. 0 means that the drive is controlled by speed setpoint. 1 means that the drive is controlled by torque setpoint. Default value is 0.
SAFETY_INTL_TEXT	SAFETY_INTL_TEXT is a description text related to the safety interlock(1). Default value is "Safety intl".
PROCESS_INTL_TEXT1	PROCESS_INTL_TEXT1 is a description text related to the operation interlock(1) B1. Default value is "Process intl".
PROCESS_INTL_TEXT2	PROCESS_INTL_TEXT2 is a description text related to the operation interlock(1) B2. Default value is "Process intl".
PROCESS_INTL_TEXT3	PROCESS_INTL_TEXT3 is a description text related to the start/operation interlock(1) B3. Default value is "Process intl".
PROCESS_INTL_TEXT4	PROCESS:INTL_TEXT4 is a description text related to the start/operation interlock(1) B4. Default value is "Process intl".
SEQUENCE_INTL_TEXT	SEQUENCE_INTL_TEXT is a description text related to the operation interlock(1) A. Default value is "Sequence intl".
TORQUE_MIN	TORQUE_MIN is the min. value of actual torque. Default value is 0.
TORQUE_MAX	TORQUE_MAX is the max. value of actual torque. Default value is 100.
ARB_VALUE_NAME	ARB_VALUE_NAME determines the name of the arbitrary value. The maximum length is 10 characters. Default value is "X".

Table 3-18. DRIS5 PU Symbols (Continued)

Symbol Name	Description
ARB_VALUE_MIN	ARB_VALUE_MIN is the min. value of an arbitrary value, can be frequency, power etc. What it represents, is configured in the drive unit. Default value is 0.
ARB_VALUE_MAX	ARB_VALUE_MAX is the max. value of an arbitrary value, can be frequency, power and so on. Which it is, is configured in the drives unit. Default value is 100.
SPEED_MIN	SPEED_MIN is the min. value of actual speed. Default value is -1500.
SPEED_MAX	SPEED_MAX is the max. value of actual speed. Default value is 1500.
EXT_SP_SPEED_MIN	EXT_SP_SPEED_MIN is the min. value of external speed reference. Default value is -100.
EXT_SP_SPEED_MAX	EXT_SP_SPEED_MAX is the max. value of external speed reference. Default value is 100.
EXT_SP_TORQUE_MIN	EXT_SP_TORQUE_MIN is the min. value of external torque reference. Default value is -100.
EXT_SP_TORQUE_MAX	EXT_SP_TORQUE_MAX is the max. value of external torque reference. Default value is 100.
PERC_SP_SPEED_MAX	PERC_SP_SPEED_MAX is the max. value of speed reference in percentage. Default value is 100.
PERC_SP_SPEED_MIN	PERC_SP_SPEED_MIN is the min. value of speed reference in percentage. Default value is -100.
CURR_MIN	CURR_MIN is the min. value of actual current. Default value is 0.
CURR_MAX	CIRR_MAX is the max. value of actual current in percentage. Default value is 100.
HIGH_CURR_LOAD	HIGH_CURR_LOAD is the highest limit used by PC for limit check of the motor current.
NORM_CURR_LOAD	NORM_CURR_LOAD is the lowest limit used by PC for limit check of the motor current.
I1_EVBLK (2)	I1_EVBLK is selection of blocking of events from IND1in main object. Default value is H'E1FF.
I2_EVBLK (2)	I2_EVBLK is selection of blocking of events from IND2 in main object. Default value is H'FFFF.
FAULT_OBJ_I1_EVBLK (2)	I1_EVBLK is selection of blocking of events from IND1in fault object. Default value is H'0000.

Table 3-18. DRIS5 PU Symbols (Continued)

Symbol Name	Description
FAULT_OBJ_I2_EVBLK (2)	I2_EVBLK is selection of blocking of events from IND2 in fault object. Default value is H’0000.
ALARM_OBJ_I1_EVBLK (2)	I1_EVBLK is selection of blocking of events from IND1in alarm object. Default value is H’FFFF.
ALARM_OBJ_I2_EVBLK (2)	I2_EVBLK is selection of blocking of events from IND2 in alarm object. Default value is H’FFFF.
RP1_CTRL (3)	RP1_CTRL is selection of blocking of repeat failure control of IND1. Default value is HFFFF.
RP2_CTRL (3)	RP2_CTRL is selection of blocking of repeat failure control of IND2. Default value is HFFFF.
SPEED_AND_ARB_UNIT	SPEED_AND_ARB_UNIT is the units of the speed value and the arbitrary value. Character 1 - 5 represents the speed unit and character 6 - 10 represents the arbitrary value unit. Default value is “%” and “X”.
JOG_SPEED	JOG_SPEED is the value in rpm for the jog speed. Default value is 20.
USE_DRIENG_SPEEDSF	USE_DRIENG_SPEEDSF defines whether the absolute speed is going to be scaled with the scale factor in the DRISTD DB element. This parameter is used if the actual speed is presented in rpm. Default value is No.
CURR_SCALING	CURR_SCALING defines the value for 1A in the drive system. Default value is 10.
ARB_VAL_SCALE	ARB_VAL_SCALE defines the scale factor for the arbitrarily value.
ABS_SP_SPEED_MIN	ABS_SP_SPEED_MIN is the value of minimum absolute speed setpoint. Default value is -1500.
ABS_SP_SPEED_MAX	ABS_SP_SPEED_MIN is the value of maximum absolute speed setpoint. Default value is 1500.

(1) For more details on interlocking see “Interlock configuration” in *Functional Units Part 8, DRICONS User’s Guide*.

(2) For more description see “Addressing of drive” in *Functional Units Part 9, DRICONE User’s Guide*

(3) See MOTCON in *Data Base Elements Advant Controller 400 Series Reference Manual* for a detailed description

– When all symbols have correct values press **OK** to instantiate the type circuit.

To connect the type circuit do the following:

– Select the terminals, one by one, and connect to constants, data base or other PC Elements. See the User’s Guides for your Engineering Station for details.

Table 3-19. DRIS5 Terminals

No	Name	Type	Description
1	**NAME**	I	Drive object name for presentation purpose.
2	**DRNODENR**	I	Drive address for diagnostic purpose.
3	**IC1**	B	Interlock C1. Operation interlock (not deblockable). Default connection is D=1.
4	**IB1**	B	Interlock B1. Operation interlock (1) (2). Default connection is D=1.
5	**IB2**	B	Interlock B2. Operation interlock (2). Default connection is D=1.
6	**IB3**	B	Interlock B3. Start/operation interlock(1) (2). Default connection is D=1.
7	**IB4**	B	Interlock B4. Start/operation interlock(2). Default connection is D=1.
8	**IBF**	B	Interlock B Function. Control input for IB3 and IB4. If IBF is set to 1, IB3 and IB4 works as start interlocks. Default connection is D=0.
9	**IA**	B	Interlock A. Operation interlock(2). Default connection is D=1.
10	**ASTART**	B	Auto Start. The start order is invoked from an other PC-program. The point of control is CENTRAL and AUTO. Default connection is D=0.
11	**ASTOP**	B	Auto Stop. The stop order is invoked from an other PC-program. The point of control is CENTRAL and AUTO. Default connection is D=0.
12	**GSTART**	B	Group Start. The start order is invoked from a group sequence. The point of control is CENTRAL and MAN. Default connection is D=0.
13	**GSTOP**	B	Group Stop. The stop order is invoked from a group sequence. The point of control is CENTRAL and MAN. Default connection is D=0.
14	**LSTART**	B	Local Start. The point of control must be LOCAL. Default connection is D=0.
15	**LSTOP**	B	Local Stop. The point of control must be LOCAL. Default connection is D=0.
16	**JOGPBFW**	B	JOG Push-button ForWard direction. The point of control must be JOG. Default connection is D=0.
17	**JOGPBREV**	B	JOG Push-button REVerse direction. The point of control must be JOG. Default connection is D=0.

Table 3-19. DRIS5 Terminals (Continued)

No	Name	Type	Description
18	**CTRLMODE**	B	ConTRoL MODE selection. Value of 0 control mode 1: reference 1 is used. Value of 1 control mode 2: reference 2 is used. Default connection is D=1. This terminal is only available when USE_FAULT_IND=1.
19	**ERROR**	B	ERROR from drive or communication error.
20	**READY**	B	Drive is READY and no interlocks.
21	**RUN**	B	Drive is RUNning.
22	**MAN**	B	Drive is in MANual mode.
23	**AUTO**	B	Drive is in AUTO mode.
24	**CENTRAL**	B	Point of control is CENTRAL. The drive is control from the Operator Station or via PC-program sequence.
25	**LOCAL**	B	Point of control is LOCAL. The drive is controlled from a local panel.
26	**JOG**	B	Point of control is JOG.
27	**STANDBY**	B	Point of control is STANDBY. The drive is put out of service.
28	**DRLOCAL**	B	Point of control is Drive Local. The control is done from the local drive panel.
29	**ESPDSP1**	R	Value of External SPeeD SetPoint1. The external speed reference is given in rpm. Default connection is D=0. This terminal is only available when USE_FAULT_IND=1.
30	**ESPDSP2**	R	Value of External SPeeD SetPoint1. The external speed reference is given in%. Default connection is D=0.
31	**ETQSP**	R	Value of External TorQue SetPoint. The external torque setpoint is given in %. Default connection is D=0.
32	**ASPEED**	R	Actual SPEED
33	**ATORQUE**	R	Actual TORQUE
34	**OFF2**	B	OFF2 determines if the Emergency is off or not. Default connection is D=1, which means that the Emergency is off.
35	**OFF3**	B	OFF3 determines if the Emergency stop is off or not. Default connection is D=1, which means that the Emergency stop is off.
37	**RMPOUT0**	B	RaMP OUTput to 0. 0=Ramp function output is zero. 1=Operating condition. Default connection is D=1.

Table 3-19. DRIS5 Terminals (Continued)

No	Name	Type	Description
38	**RMPHOLD**	B	The speed RaMPing is stopped. 0=Freeze the actual setpoint from the ramp function generator. 1=Enable ramp function generator. Default connection is D=1.
39	**RMPIN0**	B	RaMP INput to 0. 0=Speed ramp input is forced to zero. 1=Enable setpoint. Default connection is D=1.
40	**INCHING1**	B	The drive accelerates as fast as possible to INCHING setpoint 1. Default connection is D=0.
41	**INCHING2**	B	The drive accelerates as fast as possible to INCHING setpoint 2. Default connection is D=0.
42	**REMCMD**	B	REMote COMmand. 0=Reference values are freezed. 1=Reference values can be changed by the control system. Default connection is D=1.

(1) May be disabled via operator dialog.
(2) Disabled in operation mode JOG.

3.7 Configuration/Application Building Menus

Please, consult the User’s Guides for your Engineering Station.

Chapter 4 Runtime Operation

4.1 Operating Overview

Please, consult the *Functional Units Part 9, DRICONE User's Guide.*

4.2 Operating Instructions

Please, consult the *Functional Units Part 9, DRICONE User's Guide.*

4.3 Runtime Operation Menus

Please, consult the *Functional Units Part 9, DRICONE User's Guide.*

Chapter 5 Maintenance

5.1 Error Messages

Please, consult the *Functional Units Part 9, DRICONE User’s Guide*.

5.2 Fault Finding and User Repair

Please, consult the *Functional Units Part 9, DRICONE User’s Guide*.

5.3 Backup/Restore Procedures

See the User’s Guides for your Engineering Station.

Appendix A PC Diagram DRIS3

A.1 Overview Description DRIS3

The type circuit is made up of several subfunctions. Each subfunction is located on one or more pages of PC-diagram. Following is a short description of each subfunction, and an overview block diagram showing the interconnections between subfunctions.

- Input terminals.

  All input terminals of the type circuit are connected to MOVE elements here. They are grouped as on the type circuit element. All internal connections are made to the outputs of these MOVE-elements.

- Operator interface, input.

  All orders, setpoint values, and so on. are read from the data base. All internal connections are made to the outputs here.

- Visibility.

  The visibility of current values in operator displays are set according to configuration parameters. Visibility is changed according to control mode input.

- Read from drive unit.

  All status and current values are read from the drive unit and converted to real value representation.

- Point of control.

  Operator changes of point of control and status changes in the drive unit are evaluated. The current point of control is changed if appropriate.

- Interlocks.

  Interlock inputs are evaluated. The current interlock status is changed if appropriate.

- Start/stop.

  Operator and input start/stop orders are evaluated. The drive is started or stopped according to point of control and current interlock status.

- Sending to drive unit.

  Orders and setpoint values are sent to the drive unit.

- Operator interface, output.

  All current values, point of control, interlock status and so on, are read from the data base. All internal connections are made to the outputs here.

- Output terminals

  All output terminals of the type circuit are connected to MOVE elements here.
  All internal connections are made to the inputs of these MOVE elements.

A.2 Overview Block Diagram DRIS3

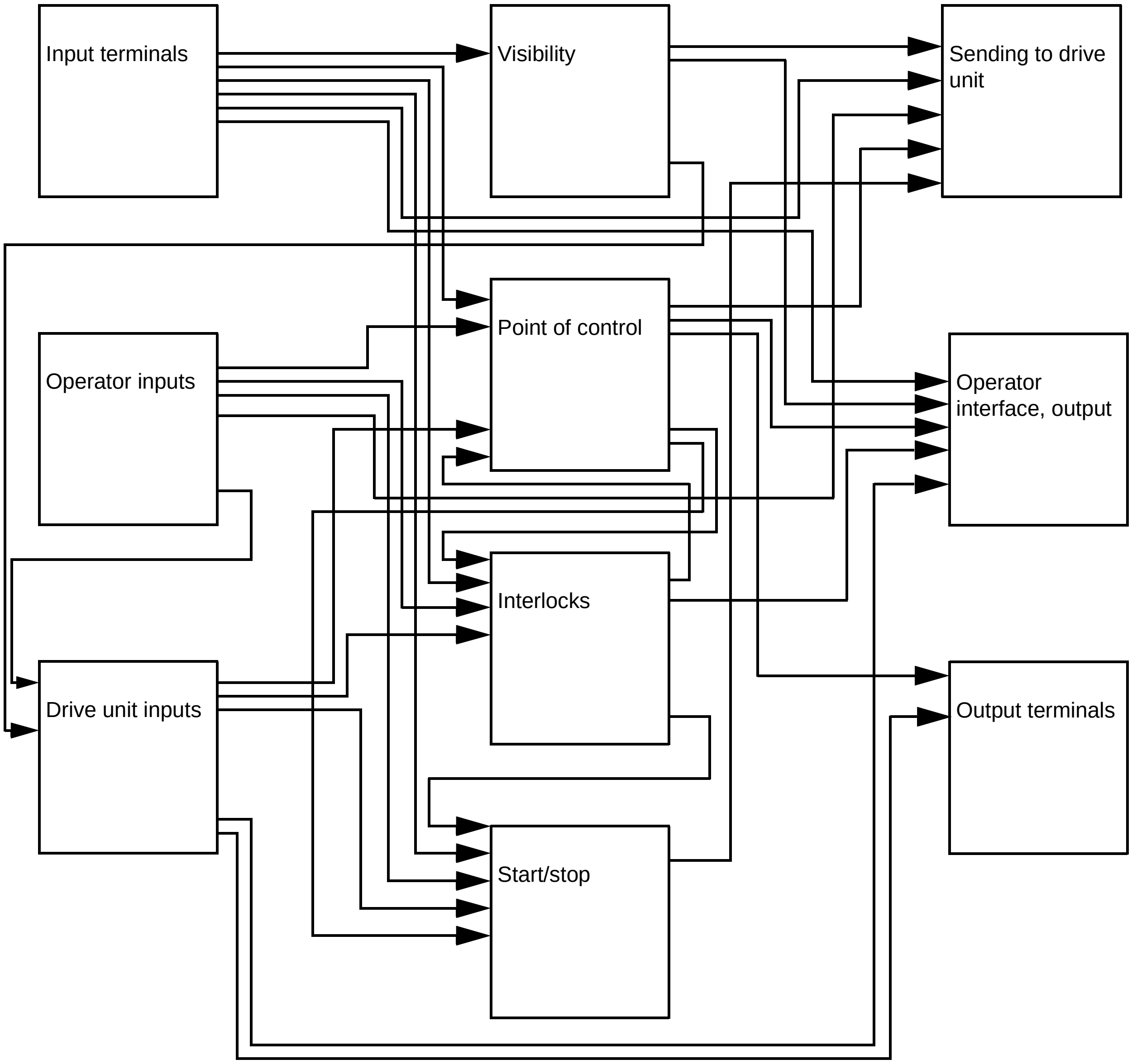


Figure A-1. Overview Diagram DRIS3

A.3 Explanation of PC Names DRIS3

Table A-1. PC Names DRIS3

PC name	Explanation
(<DRIVE_NAME>_AIA)	Sequence interlock A active
(<DRIVE_NAME>_AIB1)	Process interlock B1 active
(<DRIVE_NAME>_AIB2)	Process interlock B2 active
(<DRIVE_NAME>_AIB3)	Process interlock B3 active
(<DRIVE_NAME>_AIB4)	Process interlock B4 active
(<DRIVE_NAME>_ALU)	Unacknowledged alarm
(<DRIVE_NAME>_ASPE)	Actual speed
(<DRIVE_NAME>_ASTA)	Input auto start
(<DRIVE_NAME>_ASTO)	Input auto stop
(<DRIVE_NAME>_AUTO)	Point of control central auto active
(<DRIVE_NAME>_BLIL)	Block interlocks
(<DRIVE_NAME>_CENT)	Point of control central active
(<DRIVE_NAME>_CERR)	Drive unit communication error
(<DRIVE_NAME>_CTRM)	Drive unit control mode
(<DRIVE_NAME>_CURM)	Current max. value
(<DRIVE_NAME>_DATS)	Drive at setpoint
(<DRIVE_NAME>_DCUR)	Drive current
(<DRIVE_NAME>_DEBL)	Drive enabled
(<DRIVE_NAME>_DFLT)	Drive fault
(<DRIVE_NAME>_DLIM)	Drive at limit
(<DRIVE_NAME>_DLOC)	Point of control drive local active
(<DRIVE_NAME>_DNR)	Drive Address
(<DRIVE_NAME>_DRDY)	Drive ready
(<DRIVE_NAME>_DREM)	Drive remote controlled
(<DRIVE_NAME>_DRRE)	DRI-R error
(<DRIVE_NAME>_DRRV)	DRI-R valid
(<DRIVE_NAME>_DRSE)	DRI-S error

Table A-1. PC Names DRIS3 (Continued)

PC name	Explanation
(<DRIVE_NAME>_DRUN)	Drive running
(<DRIVE_NAME>_DSPE)	Drive actual speed
(<DRIVE_NAME>_DSTA)	Order start drive
(<DRIVE_NAME>_DTQ)	Drive torque
(<DRIVE_NAME>_DTYP)	Drive type
(<DRIVE_NAME>_DVAL)	Drive values
(<DRIVE_NAME>_DVAU)	Drive value
(<DRIVE_NAME>_DWAR)	Drive warning
(<DRIVE_NAME>_ESP1)	Input speed ref. in rpm
(<DRIVE_NAME>_ESP2)	Input speed ref. in %
(<DRIVE_NAME>_ESPP)	External speed ref. max. value
(<DRIVE_NAME>_ETQ)	Input torque ref.
(<DRIVE_NAME>_ETQP)	External torque ref. max. value
(<DRIVE_NAME>_EXTR)	Operator order external reference
(<DRIVE_NAME>_FLTR)	Fault reset
(<DRIVE_NAME>_GSTA)	Input group start
(<DRIVE_NAME>_GSTO)	Input group stop
(<DRIVE_NAME>_IA)	Input sequence interlock A
(<DRIVE_NAME>_IB1)	Input process interlock B1
(<DRIVE_NAME>_IB2)	Input process interlock B2
(<DRIVE_NAME>_IB3)	Input process interlock B3
(<DRIVE_NAME>_IB4)	Input process interlock B4
(<DRIVE_NAME>_IBF)	Input select start/operation interlock
(<DRIVE_NAME>_IC1)	Input process interlock C1
(<DRIVE_NAME>_JOG)	Point of control jog active
(<DRIVE_NAME>_JOGF)	Input jog forward
(<DRIVE_NAME>_JOGR)	Input jog reverse
(<DRIVE_NAME>_LOC)	Point of control local active
(<DRIVE_NAME>_LSTA)	Input local start

Table A-1. PC Names DRIS3 (Continued)

PC name	Explanation
(<DRIVE_NAME>_LSTO)	Input local stop
(<DRIVE_NAME>_MAN)	Point of control central man active
(<DRIVE_NAME>_NOIL)	No active interlocks
(<DRIVE_NAME>_OAUT)	Operator order auto
(<DRIVE_NAME>_OCEN)	Operator order central
(<DRIVE_NAME>_OJOG)	Operator order jog
(<DRIVE_NAME>_OLOC)	Operator order local
(<DRIVE_NAME>_OMAN)	Operator order man
(<DRIVE_NAME>_OSER)	Point of control out of service active
(<DRIVE_NAME>_OSTA)	Operator order start
(<DRIVE_NAME>_OSTO)	Operator order stop
(<DRIVE_NAME>_OSTY)	Operator order out of service
(<DRIVE_NAME>_RDY)	Drive object ready to start
(<DRIVE_NAME>_REFP)	Order reference in %
(<DRIVE_NAME>_REFR)	Order reference in rpm
(<DRIVE_NAME>_SAC1)	Visibility, show application 1
(<DRIVE_NAME>_SAC2)	Visibility, show application 2
(<DRIVE_NAME>_SAPP)	Visibility, show arbitrarily application output value
(<DRIVE_NAME>_SCD)	Visibility, show deviation
(<DRIVE_NAME>_SCUR)	Visibility, show current
(<DRIVE_NAME>_SFQ)	Visibility, show frequency
(<DRIVE_NAME>_SOUT)	Visibility, show output value
(<DRIVE_NAME>_SPEM)	Actual speed max. value
(<DRIVE_NAME>_SPER)	Operator order speed setpoint in rpm
(<DRIVE_NAME>_SPIR)	Visibility, show PID reference
(<DRIVE_NAME>_SPOW)	Visibility, show power
(<DRIVE_NAME>_SPPC)	Operator order setpoint in %
(<DRIVE_NAME>_SPPM)	Setpoint max. in %
(<DRIVE_NAME>_SPRM)	Speed setpoint max. in rpm

Table A-1. PC Names DRIS3 (Continued)

PC name	Explanation
(<DRIVE_NAME>_SREF)	Visibility, show reference
(<DRIVE_NAME>_SSPE)	Visibility, show speed
(<DRIVE_NAME>_SSPP)	Visibility, show speed in %
(<DRIVE_NAME>_SSPR)	Visibility, show speed in rpm
(<DRIVE_NAME>_STQ)	Visibility, show torque
(<DRIVE_NAME>_STQR)	Visibility, show torque reference
(<DRIVE_NAME>_TASP)	Terminal actual speed
(<DRIVE_NAME>_TATQ)	Terminal actual torque
(<DRIVE_NAME>_TAUT)	Terminal auto
(<DRIVE_NAME>_TCEN)	Terminal central
(<DRIVE_NAME>_TDLO)	Terminal drive local
(<DRIVE_NAME>_TDNR)	Terminal drive address
(<DRIVE_NAME>_TERR)	Terminal error
(<DRIVE_NAME>_TJOG)	Terminal jog
(<DRIVE_NAME>_TLOC)	Terminal local
(<DRIVE_NAME>_TMAN)	Terminal man
(<DRIVE_NAME>_TRDY)	Terminal ready
(<DRIVE_NAME>_TRQM)	Torque max. value
(<DRIVE_NAME>_TRUN)	Terminal running
(<DRIVE_NAME>_TSBY)	Terminal out of service
(<DRIVE_NAME>_VALM)	Value max. value

A.4 Detailed PC Diagram DRIS3

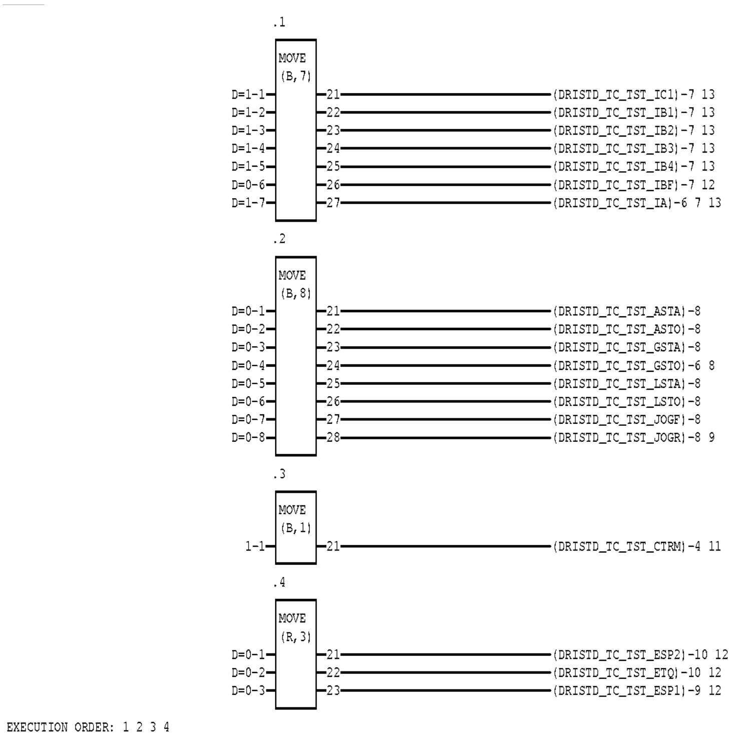

.1
MOVE
(B,7)
D=1-1
D=1-2
D=1-3
D=1-4
D=1-5
D=0-6
D=1-7
21 (DRISTD_TC_TST_IC1)-7 13
22 (DRISTD_TC_TST_IB1)-7 13
23 (DRISTD_TC_TST_IB2)-7 13
24 (DRISTD_TC_TST_IB3)-7 13
25 (DRISTD_TC_TST_IB4)-7 13
26 (DRISTD_TC_TST_IBF)-7 12
27 (DRISTD_TC_TST_IA)-6 7 13
.2
MOVE
(B,8)
D=0-1
D=0-2
D=0-3
D=0-4
D=0-5
D=0-6
D=0-7
D=0-8
21 (DRISTD_TC_TST_ASTA)-8
22 (DRISTD_TC_TST_ASTO)-8
23 (DRISTD_TC_TST_GSTA)-8
24 (DRISTD_TC_TST_GSTO)-6 8
25 (DRISTD_TC_TST_LSTA)-8
26 (DRISTD_TC_TST_LSTO)-8
27 (DRISTD_TC_TST_JOGF)-8
28 (DRISTD_TC_TST_JOGR)-8 9
.3
MOVE
(B,1)
1-1
21 (DRISTD_TC_TST_CTRM)-4 11
.4
MOVE
(R,3)
D=0-1
D=0-2
D=0-3
21 (DRISTD_TC_TST_ESP2)-10 12
22 (DRISTD_TC_TST_ETQ)-10 12
23 (DRISTD_TC_TST_ESP1)-9 12
EXECUTION ORDER: 1 2 3 4

Figure A-2. Sheet 2. Reading Data from Input Terminals

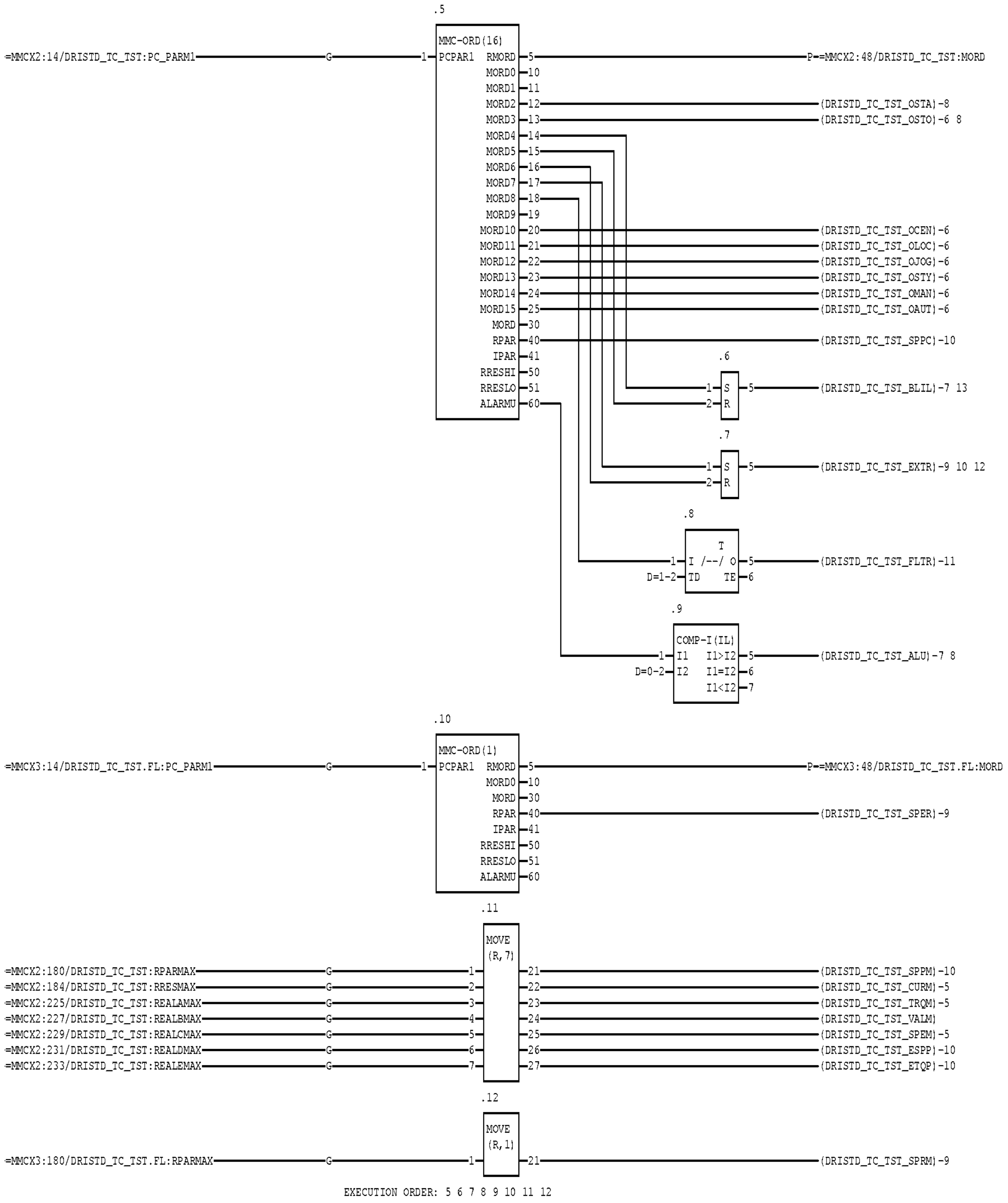

.5
MMC-ORD(16)
=MMCX2:14/DRISTD_TC_TST:PC_PARM1
G
1
PCPAR1
RMORD 5
P=MMCX2:48/DRISTD_TC_TST:MORD
MORD0 10
MORD1 11
MORD2 12
(DRISTD_TC_TST_OSTA)-8
MORD3 13
(DRISTD_TC_TST_OSTO)-6 8
MORD4 14
MORD5 15
MORD6 16
MORD7 17
MORD8 18
MORD9 19
MORD10 20
(DRISTD_TC_TST_OCEN)-6
MORD11 21
(DRISTD_TC_TST_OLOC)-6
MORD12 22
(DRISTD_TC_TST_OJOG)-6
MORD13 23
(DRISTD_TC_TST_OSTY)-6
MORD14 24
(DRISTD_TC_TST_OMAN)-6
MORD15 25
(DRISTD_TC_TST_OAUT)-6
MORD 30
RPAR 40
(DRISTD_TC_TST_SPPC)-10
IPAR 41
RRESHI 50
RRESLO 51
ALARMU 60
.6
1 S 5
2 R
(DRISTD_TC_TST_BLIL)-7 13
.7
1 S 5
2 R
(DRISTD_TC_TST_EXTR)-9 10 12
.8
T
1 I /--/ O 5
D=1-2 TD TE 6
(DRISTD_TC_TST_FLTR)-11
.9
COMP-I(IL)
1 I1 I1>I2 5
D=0-2 I2 I1=I2 6
I1<I2 7
(DRISTD_TC_TST_ALU)-7 8
.10
MMC-ORD(1)
=MMCX3:14/DRISTD_TC_TST.FL:PC_PARM1
G
1
PCPAR1
RMORD 5
P=MMCX3:48/DRISTD_TC_TST.FL:MORD
MORD0 10
MORD 30
RPAR 40
(DRISTD_TC_TST_SPER)-9
IPAR 41
RRESHI 50
RRESLO 51
ALARMU 60
.11
MOVE
(R,7)
=MMCX2:180/DRISTD_TC_TST:RPARMAX G 1 21 (DRISTD_TC_TST_SPPM)-10
=MMCX2:184/DRISTD_TC_TST:RRESMAX G 2 22 (DRISTD_TC_TST_CURM)-5
=MMCX2:225/DRISTD_TC_TST:REALAMAX G 3 23 (DRISTD_TC_TST_TRQM)-5
=MMCX2:227/DRISTD_TC_TST:REALBMAX G 4 24 (DRISTD_TC_TST_VALM)
=MMCX2:229/DRISTD_TC_TST:REALCMAX G 5 25 (DRISTD_TC_TST_SPEM)-5
=MMCX2:231/DRISTD_TC_TST:REALDMAX G 6 26 (DRISTD_TC_TST_ESPP)-10
=MMCX2:233/DRISTD_TC_TST:REALEMAX G 7 27 (DRISTD_TC_TST_ETQP)-10
.12
MOVE
(R,1)
=MMCX3:180/DRISTD_TC_TST.FL:RPARMAX G 1 21 (DRISTD_TC_TST_SPRM)-9
EXECUTION ORDER: 5 6 7 8 9 10 11 12

Figure A-3. Sheet 3. Reading from Dialogs

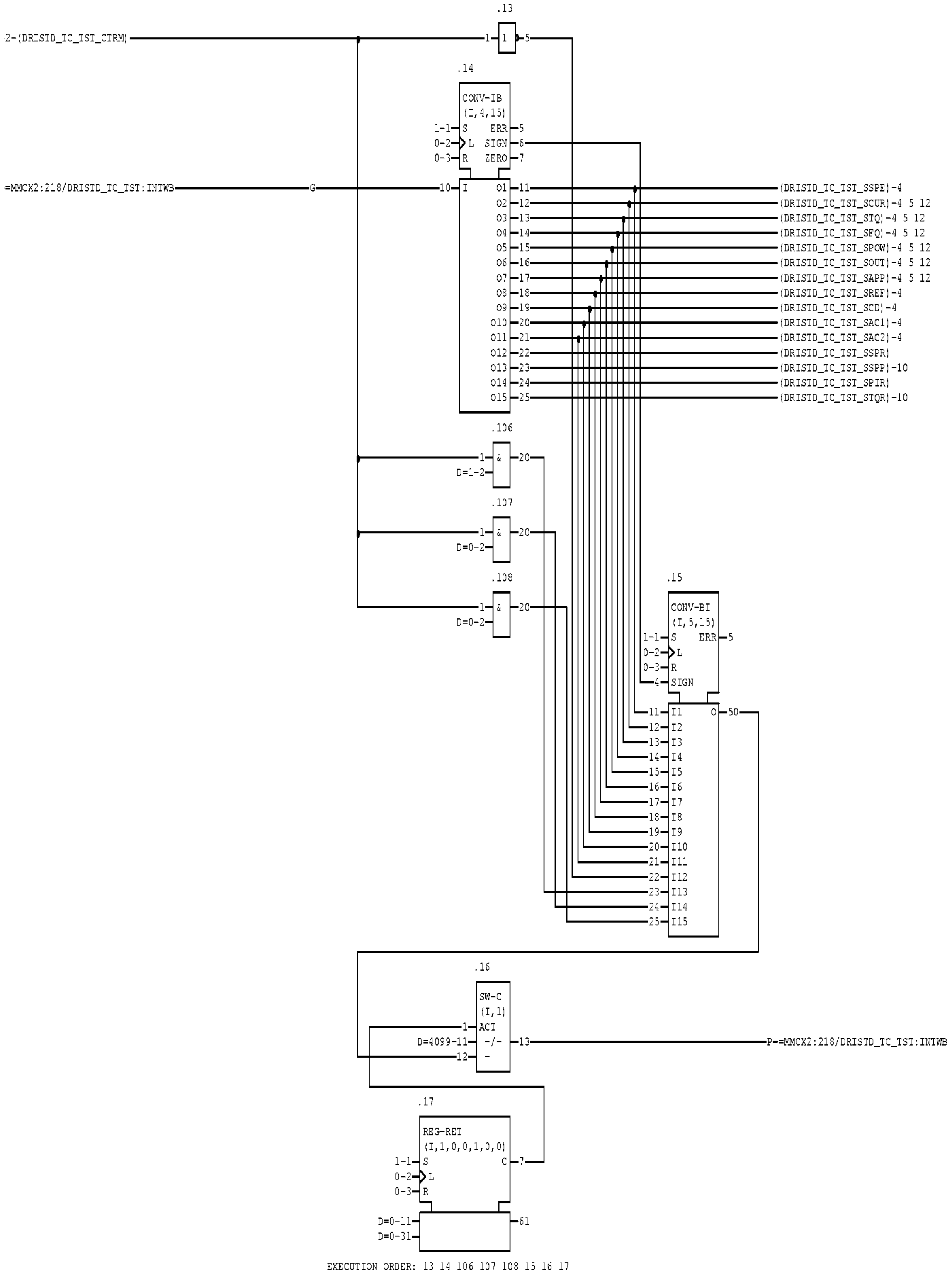


Figure A-4. Sheet 4. Drive Control Mode and Visibility

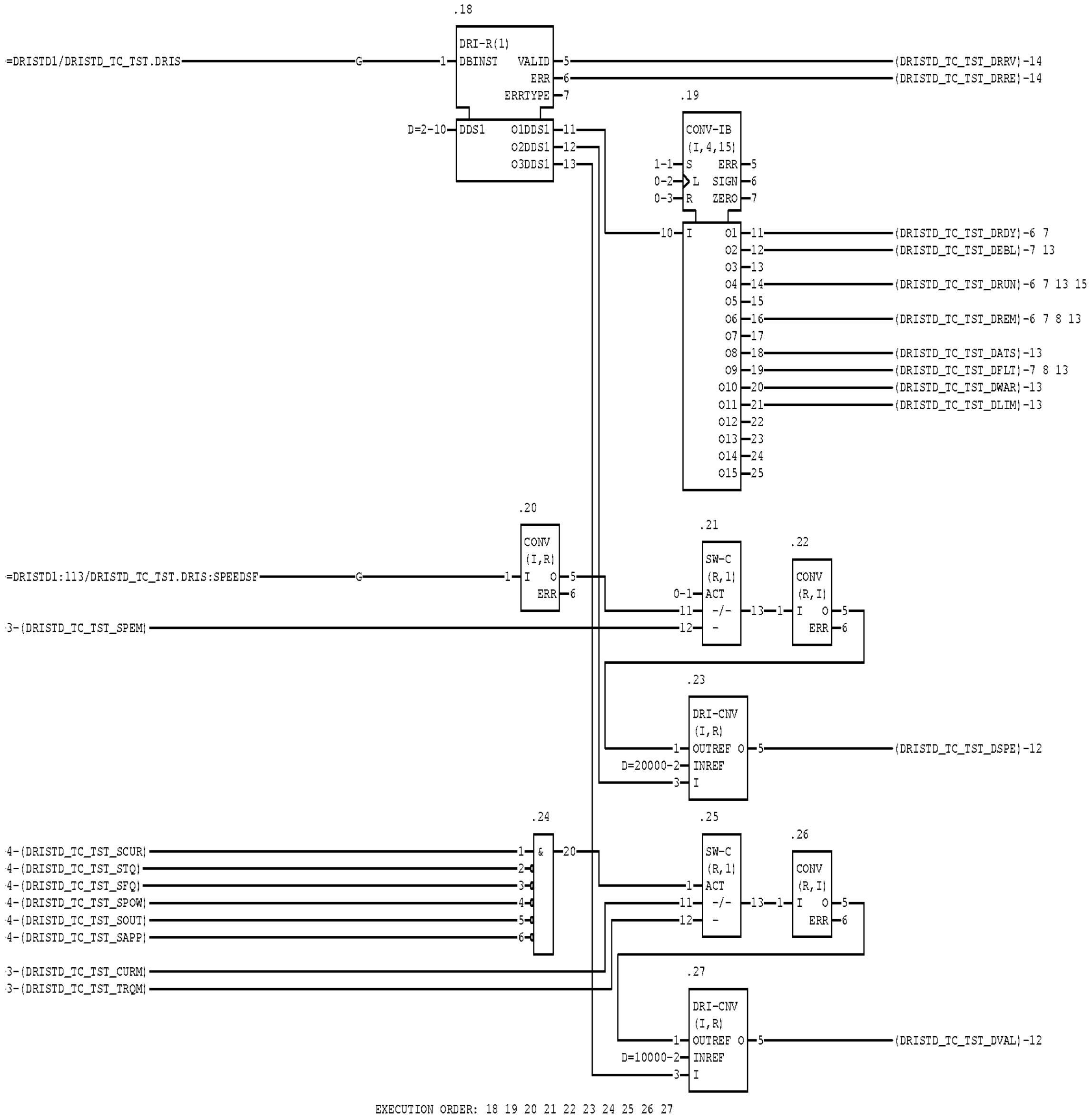


Figure A-5. Sheet 5. Reading from Drive Unit

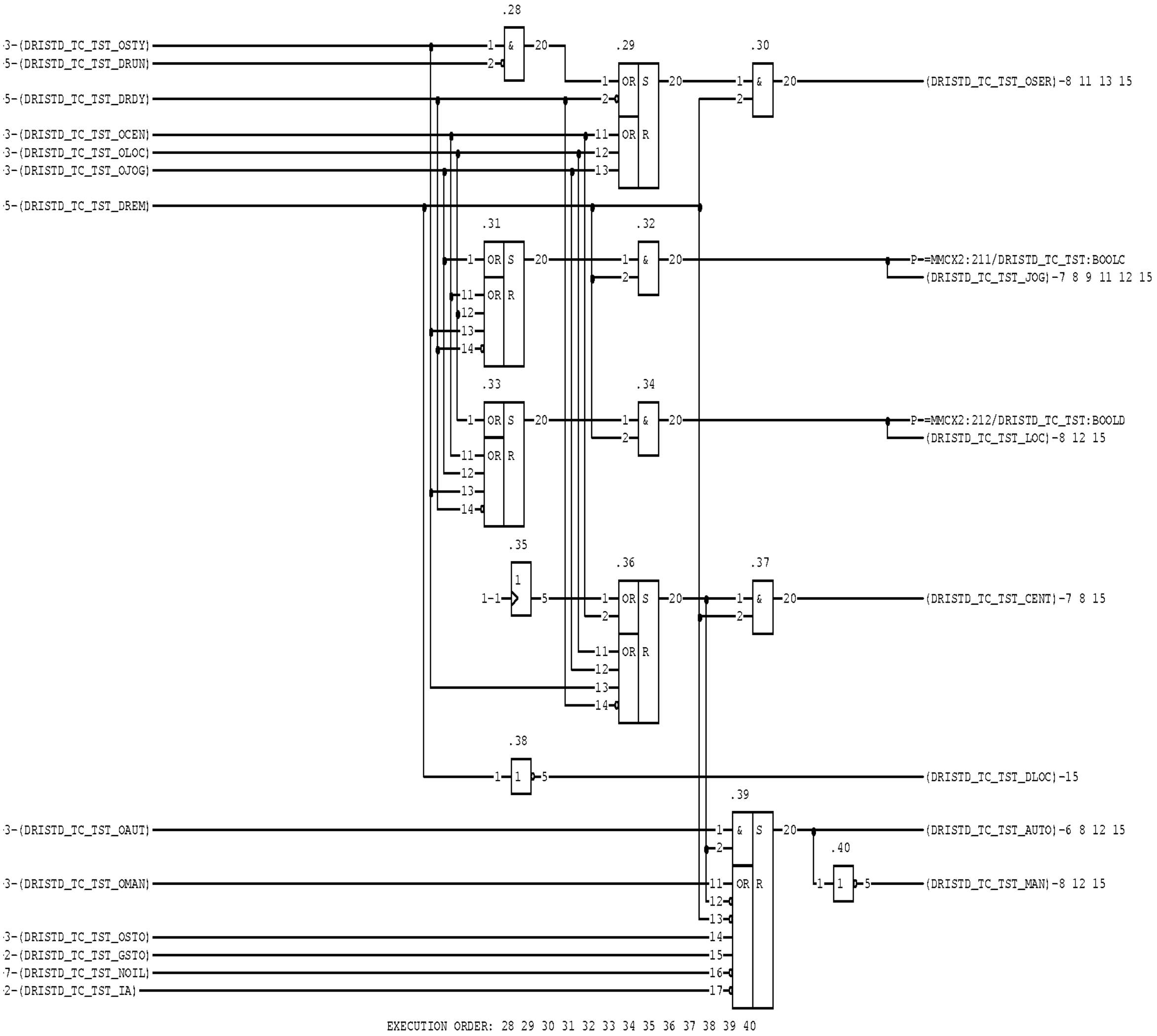


Figure A-6. Sheet 6. Point of Control

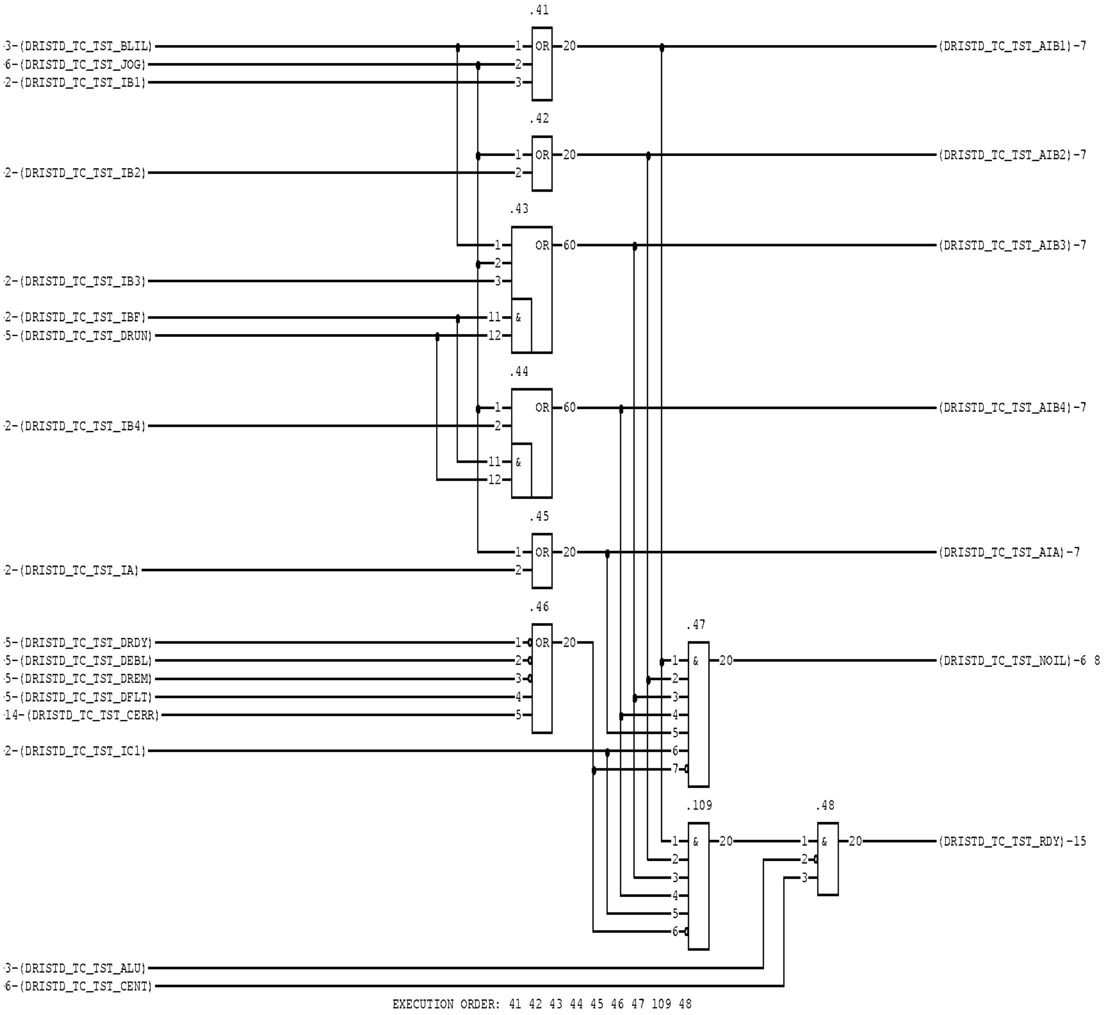


Figure A-7. Sheet 7. Interlocks

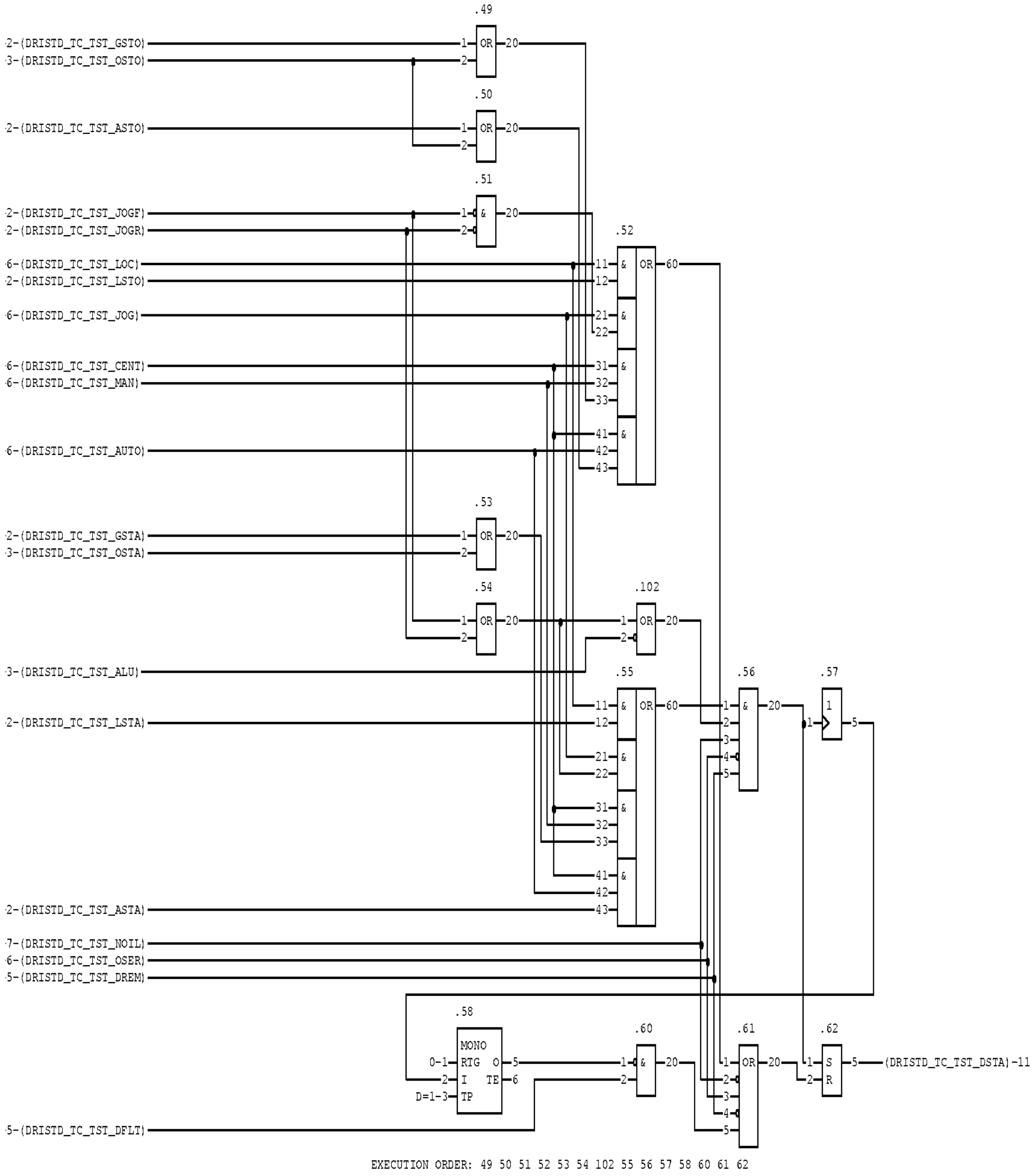


Figure A-8. Sheet 8. Start/Stop

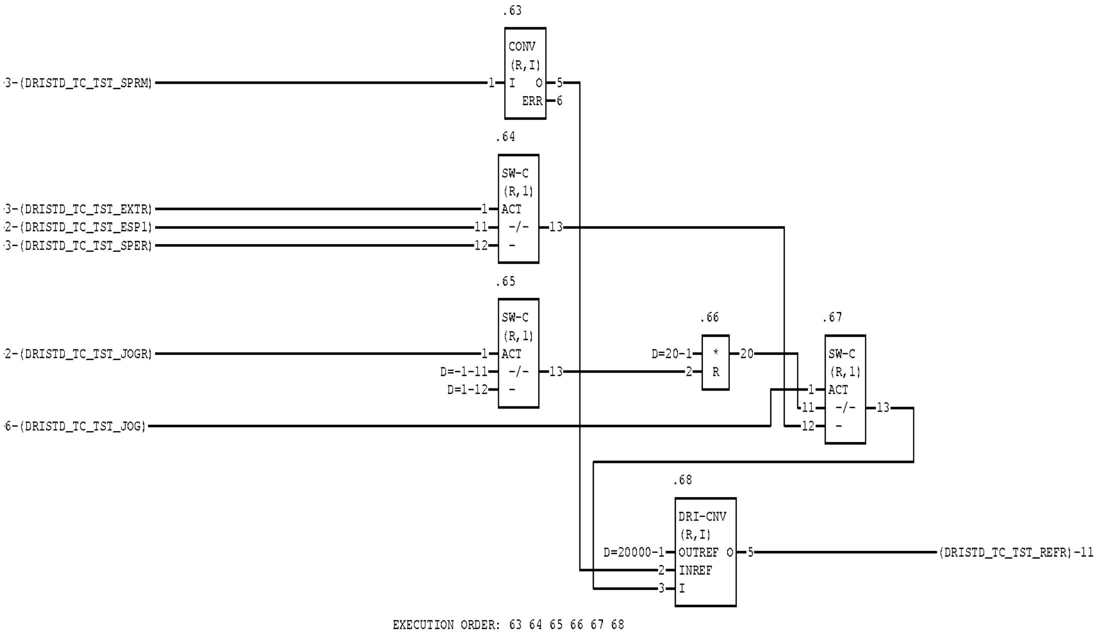


Figure A-9. Sheet 9. Sending to Drive Unit

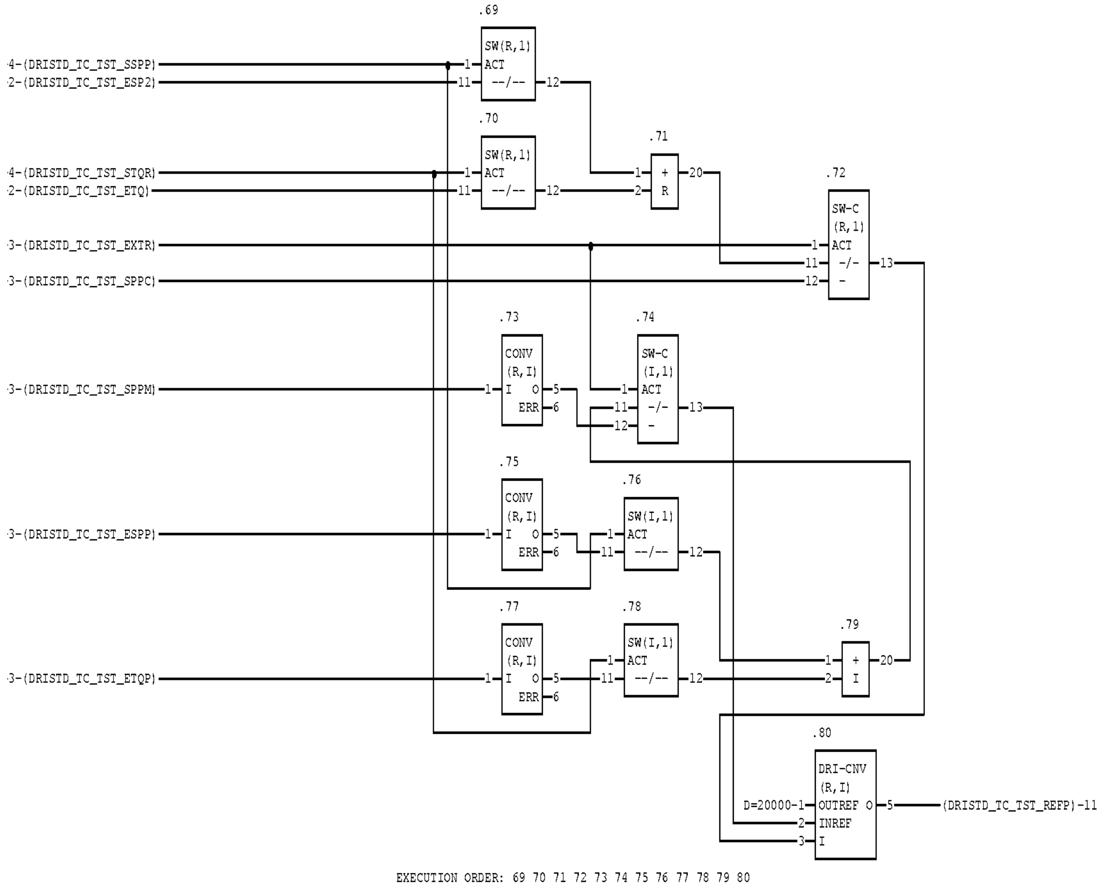


Figure A-10. Sheet 10. Sending to Drive Unit

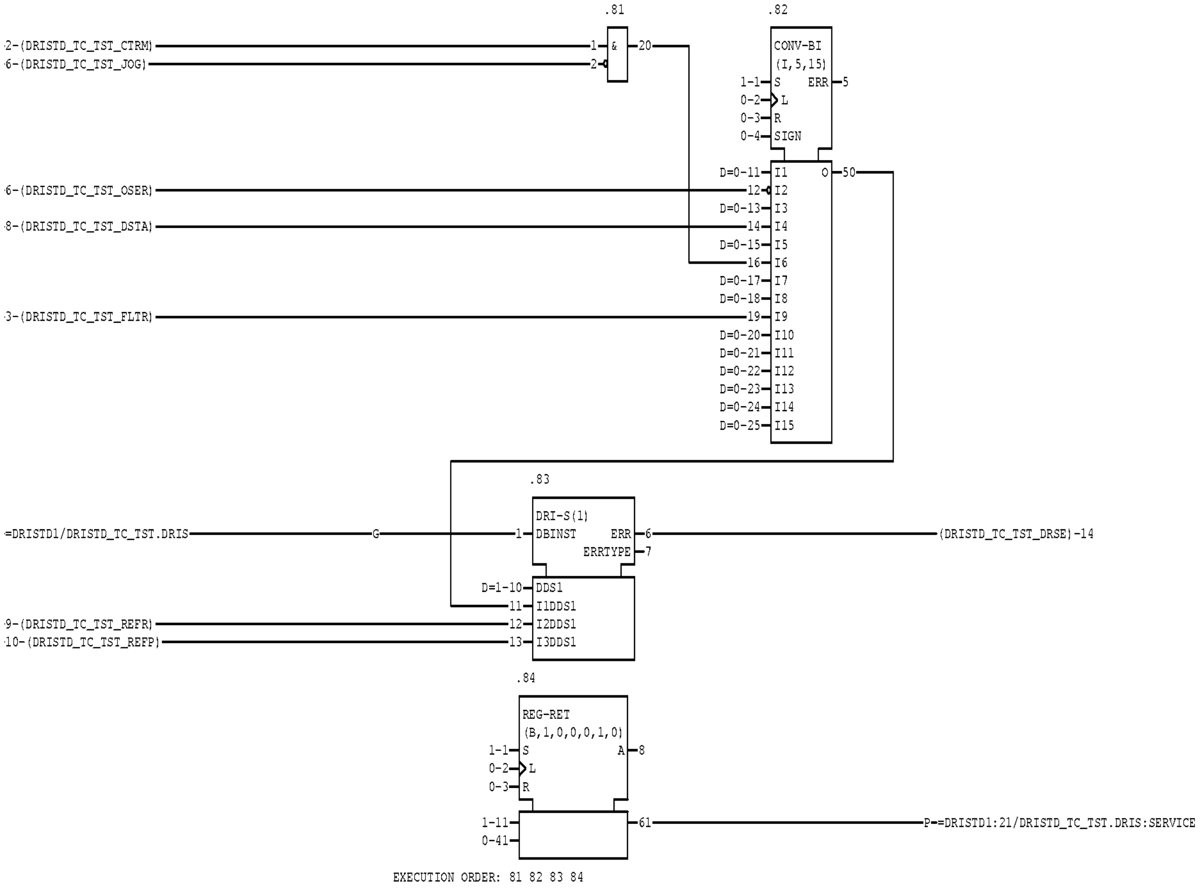


Figure A-11. Sheet 11. Sending to Drive Unit

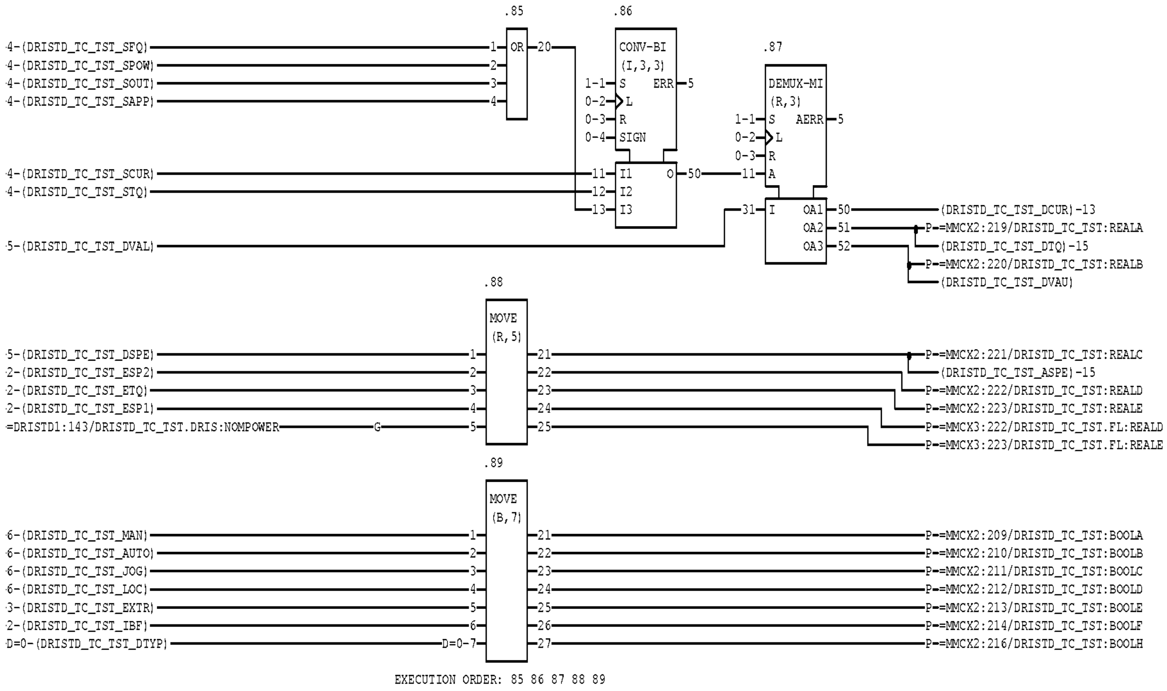


Figure A-12. Sheet 12. Storing Data for Presentation

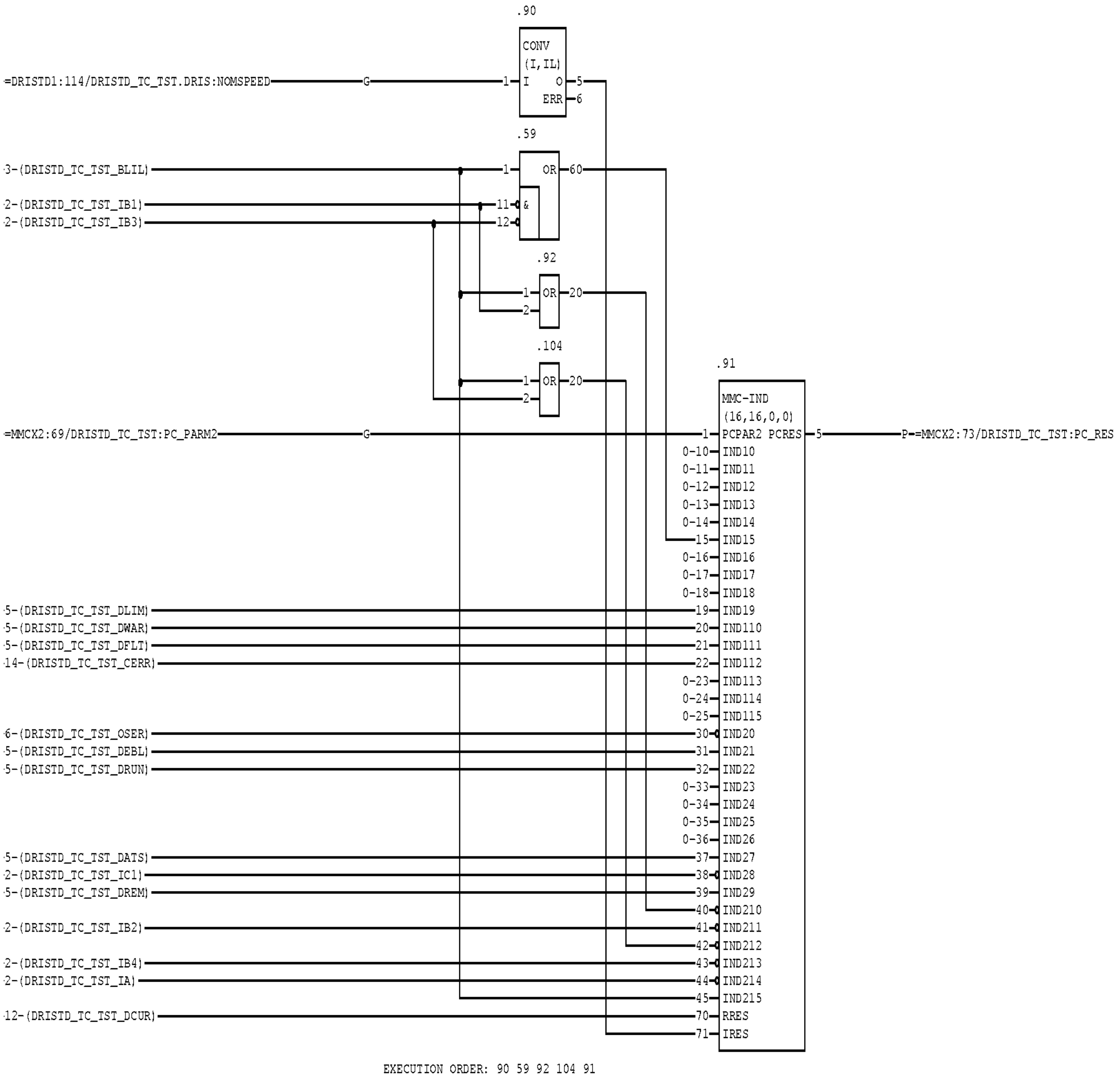

.90
CONV
(I,IL)
=DRISTD1:114/DRISTD_TC_TST.DRIS:NOMSPEED
G
1
I
O
ERR
5
6
.59
3-(DRISTD_TC_TST_BLIL)
2-(DRISTD_TC_TST_IB1)
2-(DRISTD_TC_TST_IB3)
1
11
12
OR
&
60
.92
1
2
OR
20
.104
1
2
OR
20
.91
MMC-IND
(16,16,0,0)
=MMCX2:69/DRISTD_TC_TST:PC_PARM2
G
1
PCPAR2 PCRES
5
P==MMCX2:73/DRISTD_TC_TST:PC_RES
0-10 IND10
0-11 IND11
0-12 IND12
0-13 IND13
0-14 IND14
15 IND15
0-16 IND16
0-17 IND17
0-18 IND18
5-(DRISTD_TC_TST_DLIM) 19 IND19
5-(DRISTD_TC_TST_DWAR) 20 IND110
5-(DRISTD_TC_TST_DFLT) 21 IND111
14-(DRISTD_TC_TST_CERR) 22 IND112
0-23 IND113
0-24 IND114
0-25 IND115
6-(DRISTD_TC_TST_OSER) 30 IND20
5-(DRISTD_TC_TST_DEBL) 31 IND21
5-(DRISTD_TC_TST_DRUN) 32 IND22
0-33 IND23
0-34 IND24
0-35 IND25
0-36 IND26
5-(DRISTD_TC_TST_DATS) 37 IND27
2-(DRISTD_TC_TST_IC1) 38 IND28
5-(DRISTD_TC_TST_DREM) 39 IND29
40 IND210
2-(DRISTD_TC_TST_IB2) 41 IND211
42 IND212
2-(DRISTD_TC_TST_IB4) 43 IND213
2-(DRISTD_TC_TST_IA) 44 IND214
45 IND215
12-(DRISTD_TC_TST_DCUR) 70 RRES
71 IRES
EXECUTION ORDER: 90 59 92 104 91

Figure A-13. Sheet 13. Storing Data for Presentation

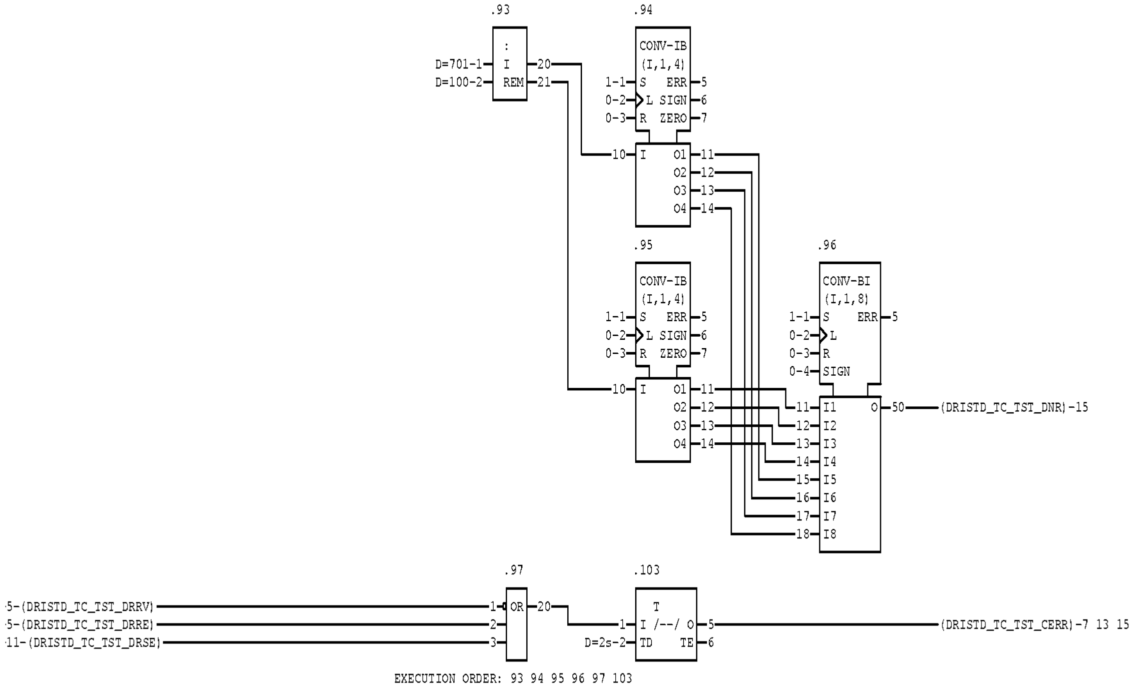


Figure A-14. Sheet 14. Storing Data on Output Terminals

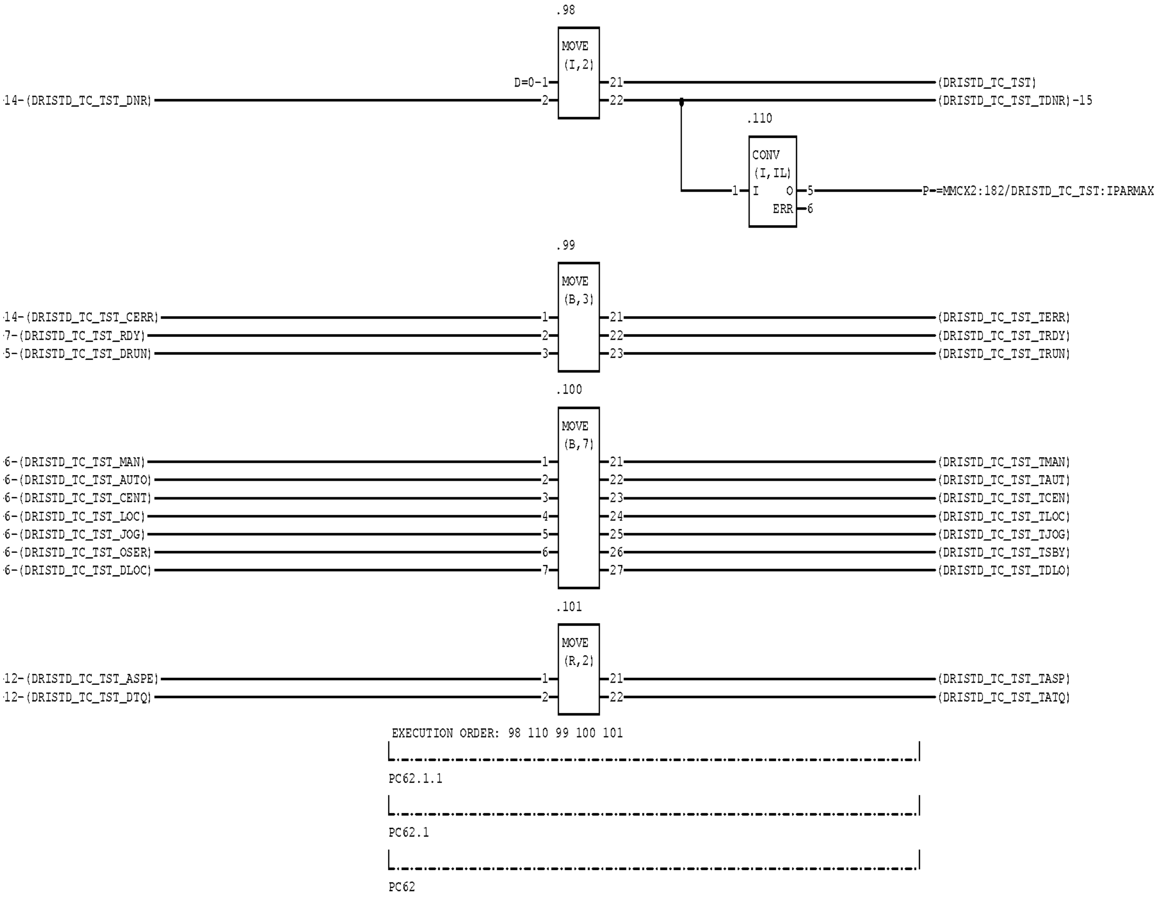


Figure A-15. Sheet 15. Storing Data on Output Terminals

Appendix B PC Diagram DRIE4

B.1 Overview Description DRIE4

The type circuit is made up of several subfunctions. Each subfunction is located on one or more pages of PC-diagram. Following is a short description of each subfunction, and an overview block diagram showing the interconnections between subfunctions.

- Input terminals.

  All input terminals of the type circuit are connected to MOVE elements. They are grouped as on the type circuit element. All internal connections are made to the outputs of these MOVE-elements.

- Operator interface, input.

  All orders, setpoint values, and so on. are read from the data base. All internal connections are made to the outputs here.

- Visibility.

  The visibility of current values in operator displays are set according to configuration parameters. Visibility is changed according to control mode input.

- Read from drive unit.

  All status and current values are read from the drive unit and converted to real value representation.

- Point of control.

  Operator changes of point of control and status changes in the drive unit are evaluated. The current point of control is changed if appropriate.

- Interlocks.

  Interlock inputs are evaluated. The current interlock status is changed if appropriate.

- Start/stop.

  Operator and input start/stop orders are evaluated. The drive is started or stopped according to point of control and current interlock status.

- Sending to drive unit.

  Orders and setpoint values are sent to the drive unit.

- Operator interface, output.

  All current values, point of control, interlock status and so on, are read from the data base. All internal connections are made to the outputs here.

- Output terminals

  All output terminals of the type circuit are connected to MOVE elements here.
  All internal connections are made to the inputs of these MOVE elements.

B.2 Overview Block Diagram DRIE4

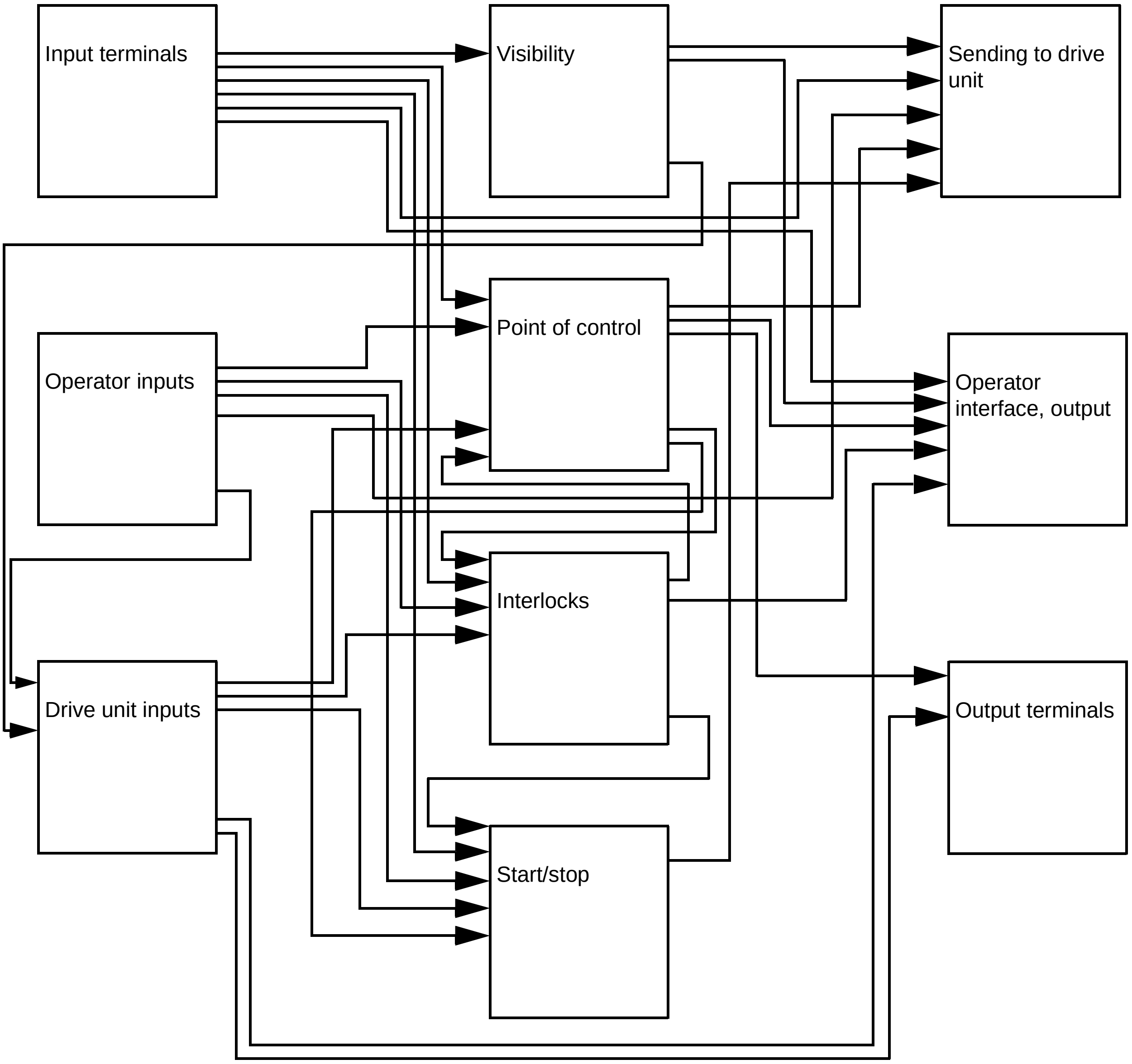


Figure B-1. Overview Diagram DRIE4

B.3 Explanation of PC Names DRIE4

Table B-1. PC Names DRIE4

PC name	Explanation
(<DRIVE_NAME>_ACUR)	Actual current
(<DRIVE_NAME>_AIA)	Sequence interlock A active
(<DRIVE_NAME>_AIB1)	Process interlock B1 active
(<DRIVE_NAME>_AIB2)	Process interlock B2 active
(<DRIVE_NAME>_AIB3)	Process interlock B3 active
(<DRIVE_NAME>_AIB4)	Process interlock B4 active
(<DRIVE_NAME>_ALM1)	Alarmword 1
(<DRIVE_NAME>_ALM2)	Alarmword 2
(<DRIVE_NAME>_ALU)	Unacknowledged alarm
(<DRIVE_NAME>_ASPE)	Actual speed
(<DRIVE_NAME>_ASTA)	Input auto start
(<DRIVE_NAME>_ASTO)	Input auto stop
(<DRIVE_NAME>_ATQ)	Actual torque
(<DRIVE_NAME>_AUTO)	Point of control central auto active
(<DRIVE_NAME>_AUXS)	Auxiliary status word
(<DRIVE_NAME>_BLIL)	Block interlocks
(<DRIVE_NAME>_CENT)	Point of control central active
(<DRIVE_NAME>_CERR)	Drive unit communication error
(<DRIVE_NAME>_CTRM)	Drive unit control mode
(<DRIVE_NAME>_CURM)	Current max. value
(<DRIVE_NAME>_D1ST)	First start of drive not done
(<DRIVE_NAME>_DALI)	Drive above limit
(<DRIVE_NAME>_DALM)	Drive alarm
(<DRIVE_NAME>_DASP)	Drive at setpoint
(<DRIVE_NAME>_DATQ)	Terminal actual torque
(<DRIVE_NAME>_DCUR)	Drive current
(<DRIVE_NAME>_DESC)	Drive description

Table B-1. PC Names DRIE4 (Continued)

PC name	Explanation
(<DRIVE_NAME>_DINH)	Drive switch on inhibit
(<DRIVE_NAME>_DIRD)	Drive ID-run completed
(<DRIVE_NAME>_DLDR)	Drive data logger ready
(<DRIVE_NAME>_DLIM)	Drive limiting
(<DRIVE_NAME>_DLOC)	Point of control drive local active
(<DRIVE_NAME>_DMGN)	Drive magnetized
(<DRIVE_NAME>_DOF2)	No OFF2 (emergency off)
(<DRIVE_NAME>_DOF3)	No OFF3 (emergency stop off)
(<DRIVE_NAME>_DOOW)	Drive out of window
(<DRIVE_NAME>_DRDR)	Drive ready
(<DRIVE_NAME>_DREM)	Drive remote control
(<DRIVE_NAME>_DRON)	Drive ready to switch on
(<DRIVE_NAME>_DRRE)	DRI-R error
(<DRIVE_NAME>_DRRF)	Drive running
(<DRIVE_NAME>_DRRV)	DRI-R valid
(<DRIVE_NAME>_DRSE)	DRI-S error
(<DRIVE_NAME>_DRUD)	Drive run disabled
(<DRIVE_NAME>_DSPE)	Drive actual speed
(<DRIVE_NAME>_DSTA)	Order start drive
(<DRIVE_NAME>_DSTI)	Drive start inhibition
(<DRIVE_NAME>_DSYR)	Drive position counter ready
(<DRIVE_NAME>_DTQ)	Drive torque
(<DRIVE_NAME>_DTQC)	Drive torque controlled
(<DRIVE_NAME>_DTRP)	Drive tripped (fault)
(<DRIVE_NAME>_DVAL)	Drive value
(<DRIVE_NAME>_DZSP)	Drive zero speed
(<DRIVE_NAME>_ESP1)	Input speed ref. in rpm
(<DRIVE_NAME>_ESP2)	Input speed ref. in %
(<DRIVE_NAME>_ESPP)	External speed ref. max. value

Table B-1. PC Names DRIE4 (Continued)

PC name	Explanation
(<DRIVE_NAME>_ETQ)	Input torque ref.
(<DRIVE_NAME>_ETQP)	External torque ref. max. value
(<DRIVE_NAME>_EXTR)	Operator order external reference
(<DRIVE_NAME>_FLT1)	Fault word 1
(<DRIVE_NAME>_FLT2)	Fault word 2
(<DRIVE_NAME>_FLTR)	Fault reset
(<DRIVE_NAME>_GSTA)	Input group start
(<DRIVE_NAME>_GSTO)	Input group stop
(<DRIVE_NAME>_IA)	Input sequence interlock A
(<DRIVE_NAME>_IB1)	Input process interlock B1
(<DRIVE_NAME>_IB2)	Input process interlock B2
(<DRIVE_NAME>_IB3)	Input process interlock B3
(<DRIVE_NAME>_IB4)	Input process interlock B4
(<DRIVE_NAME>_IBF)	Input select start/operation interlock
(<DRIVE_NAME>_IC1)	Input process interlock C1
(<DRIVE_NAME>_INC1)	Input inching 1
(<DRIVE_NAME>_INC2)	Input inching 2
(<DRIVE_NAME>_JOG)	Point of control jog active
(<DRIVE_NAME>_JOGF)	Input jog forward
(<DRIVE_NAME>_JOGR)	Input jog reverse
(<DRIVE_NAME>_LIM1)	Limit word 1
(<DRIVE_NAME>_LIM2)	Limit word 2
(<DRIVE_NAME>_LOC)	Point of control local active
(<DRIVE_NAME>_LSTA)	Input local start
(<DRIVE_NAME>_LSTO)	Input local stop
(<DRIVE_NAME>_MAN)	Point of control central man active
(<DRIVE_NAME>_MAIS)	Main status word
(<DRIVE_NAME>_NOCU)	Nominal current
(<DRIVE_NAME>_NOIL)	No active interlocks

Table B-1. PC Names DRIE4 (Continued)

PC name	Explanation
(<DRIVE_NAME>_NOMS)	Nominal speed
(<DRIVE_NAME>_OAUT)	Operator order auto
(<DRIVE_NAME>_OCEN)	Operator order central
(<DRIVE_NAME>_OFF2)	Input OFF2
(<DRIVE_NAME>_OFF3)	Input OFF3
(<DRIVE_NAME>_OJOG)	Operator order jog
(<DRIVE_NAME>_OLOC)	Operator order local
(<DRIVE_NAME>_OMAN)	Operator order man
(<DRIVE_NAME>_OSER)	Point of control out of service active
(<DRIVE_NAME>_OSTA)	Operator order start
(<DRIVE_NAME>_OSTO)	Operator order stop
(<DRIVE_NAME>_OSTY)	Operator order out of service
(<DRIVE_NAME>_RAHO)	Input ramp hold
(<DRIVE_NAME>_RAIZ)	Input ramp input zero
(<DRIVE_NAME>_RAOZ)	Input ramp output zero
(<DRIVE_NAME>_RCMD)	Input remote command
(<DRIVE_NAME>_RDY)	Drive ready
(<DRIVE_NAME>_REFP)	Order reference in %
(<DRIVE_NAME>_REFR)	Order reference in rpm
(<DRIVE_NAME>_REFS)	Order reference speed
(<DRIVE_NAME>_REFT)	Order reference torque
(<DRIVE_NAME>_SCUR)	Visibility, show current
(<DRIVE_NAME>_SPEM)	Actual speed max. value
(<DRIVE_NAME>_SPER)	Operator order speed setpoint in rpm
(<DRIVE_NAME>_SPIR)	Visibility, show PID reference
(<DRIVE_NAME>_SPPC)	Operator order setpoint in %
(<DRIVE_NAME>_SPPM)	Setpoint max. in %
(<DRIVE_NAME>_SPRM)	Speed setpoint max. in rpm
(<DRIVE_NAME>_SRFM)	Input speed reference mode

Table B-1. PC Names DRIE4 (Continued)

PC name	Explanation
(<DRIVE_NAME>_SSPE)	Visibility, show speed
(<DRIVE_NAME>_SSPP)	Visibility, show speed in %
(<DRIVE_NAME>_SSPR)	Visibility, show speed in rpm
(<DRIVE_NAME>_STQ)	Visibility, show torque
(<DRIVE_NAME>_STQR)	Visibility, show torque reference
(<DRIVE_NAME>_SVAL)	Visibility, show actual value
(<DRIVE_NAME>_TASP)	Terminal actual speed
(<DRIVE_NAME>_TAUT)	Terminal auto
(<DRIVE_NAME>_TCEN)	Terminal central
(<DRIVE_NAME>_TDLO)	Terminal drive local
(<DRIVE_NAME>_TDNR)	Terminal drive address
(<DRIVE_NAME>_TERR)	Terminal error
(<DRIVE_NAME>_TJOG)	Terminal jog
(<DRIVE_NAME>_TLOC)	Terminal local
(<DRIVE_NAME>_TMAN)	Terminal man
(<DRIVE_NAME>_TRDY)	Terminal ready
(<DRIVE_NAME>_TRQM)	Torque max. value
(<DRIVE_NAME>_TRUN)	Terminal running
(<DRIVE_NAME>_TSBY)	Terminal out of service
(<DRIVE_NAME>_VALM)	Value max. value

B.4 Detailed PC Diagram DRIE4

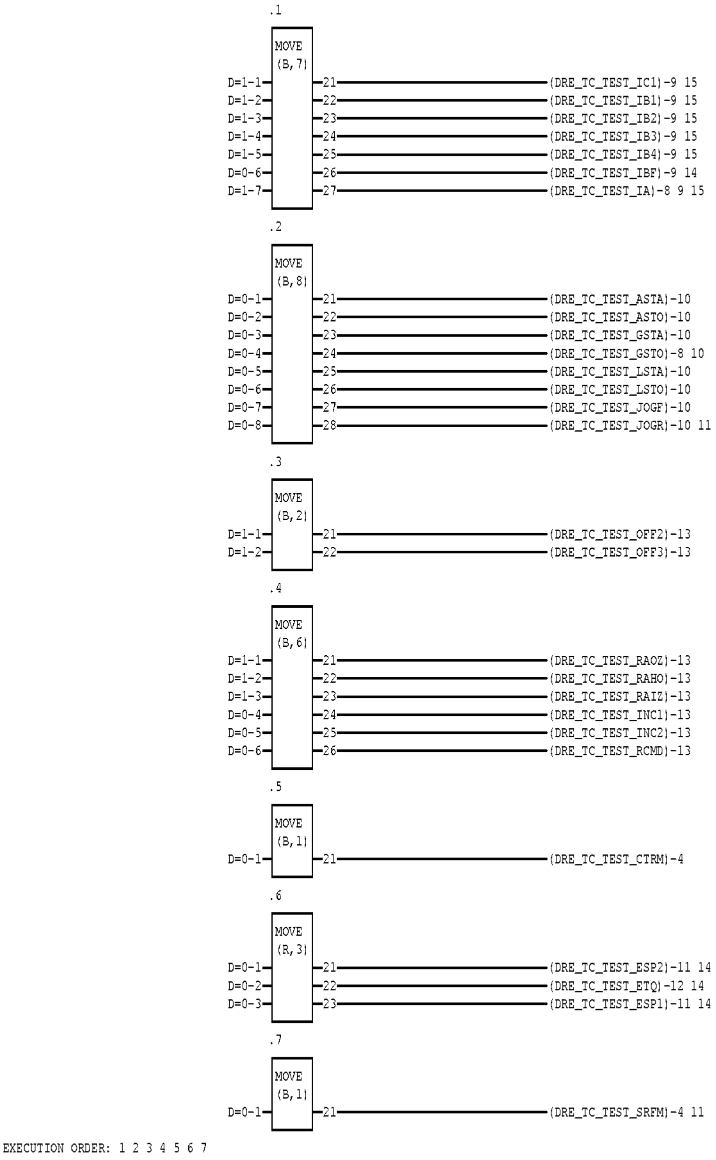


Figure B-2. Sheet 2. Reading Data from Input Terminals

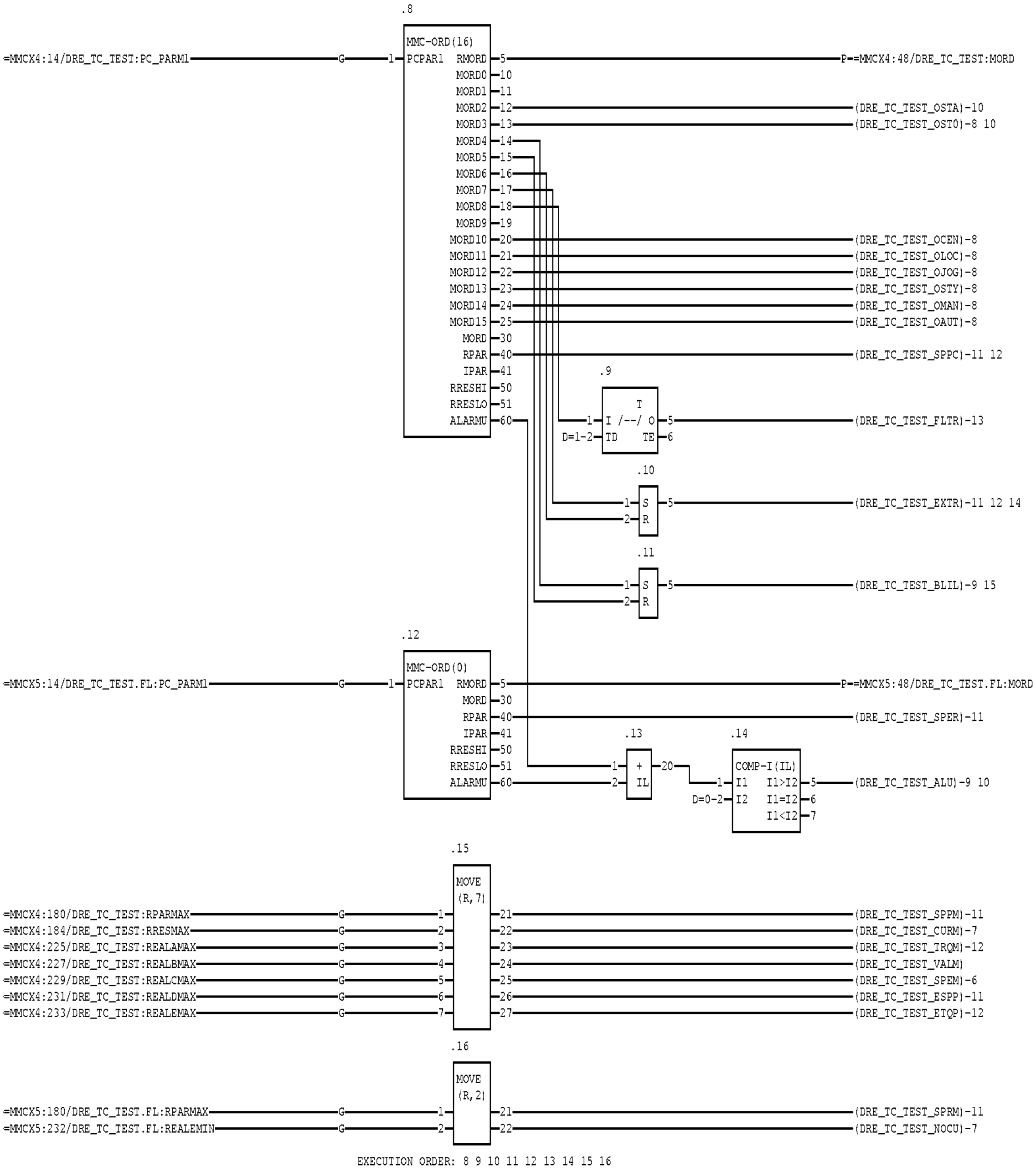

.8
MMC-ORD(16)
=MMCX4:14/DRE_TC_TEST:PC_PARM1
G
1
PCPAR1
RMORD 5
MORD0 10
MORD1 11
MORD2 12
MORD3 13
MORD4 14
MORD5 15
MORD6 16
MORD7 17
MORD8 18
MORD9 19
MORD10 20
MORD11 21
MORD12 22
MORD13 23
MORD14 24
MORD15 25
MORD 30
RPAR 40
IPAR 41
RRESHI 50
RRESLO 51
ALARMU 60
P-=MMCX4:48/DRE_TC_TEST:MORD
(DRE_TC_TEST_OSTA)-10
(DRE_TC_TEST_OSTO)-8 10
(DRE_TC_TEST_OCEN)-8
(DRE_TC_TEST_OLOC)-8
(DRE_TC_TEST_OJOG)-8
(DRE_TC_TEST_OSTY)-8
(DRE_TC_TEST_OMAN)-8
(DRE_TC_TEST_OAUT)-8
(DRE_TC_TEST_SPPC)-11 12
.9
T
1 I /--/ O 5
D=1-2 TD TE 6
(DRE_TC_TEST_FLTR)-13
.10
1 S 5
2 R
(DRE_TC_TEST_EXTR)-11 12 14
.11
1 S 5
2 R
(DRE_TC_TEST_BLIL)-9 15
.12
MMC-ORD(0)
=MMCX5:14/DRE_TC_TEST.FL:PC_PARM1
G
1 PCPAR1
RMORD 5
MORD 30
RPAR 40
IPAR 41
RRESHI 50
RRESLO 51
ALARMU 60
P-=MMCX5:48/DRE_TC_TEST.FL:MORD
(DRE_TC_TEST_SPER)-11
.13
1 + 20
2 IL
.14
COMP-I(IL)
1 I1 I1>I2 5
D=0-2 I2 I1=I2 6
I1<I2 7
(DRE_TC_TEST_ALU)-9 10
.15
MOVE
(R,7)
=MMCX4:180/DRE_TC_TEST:RPARMAX G 1 21 (DRE_TC_TEST_SPPM)-11
=MMCX4:184/DRE_TC_TEST:RRESMAX G 2 22 (DRE_TC_TEST_CURM)-7
=MMCX4:225/DRE_TC_TEST:REALAMAX G 3 23 (DRE_TC_TEST_TRQM)-12
=MMCX4:227/DRE_TC_TEST:REALBMAX G 4 24 (DRE_TC_TEST_VALM)
=MMCX4:229/DRE_TC_TEST:REALCMAX G 5 25 (DRE_TC_TEST_SPEM)-6
=MMCX4:231/DRE_TC_TEST:REALDMAX G 6 26 (DRE_TC_TEST_ESPP)-11
=MMCX4:233/DRE_TC_TEST:REALEMAX G 7 27 (DRE_TC_TEST_ETQP)-12
.16
MOVE
(R,2)
=MMCX5:180/DRE_TC_TEST.FL:RPARMAX G 1 21 (DRE_TC_TEST_SPRM)-11
=MMCX5:232/DRE_TC_TEST.FL:REALEMIN G 2 22 (DRE_TC_TEST_NOCU)-7
EXECUTION ORDER: 8 9 10 11 12 13 14 15 16

Figure B-3. Sheet 3. Reading from Dialogs

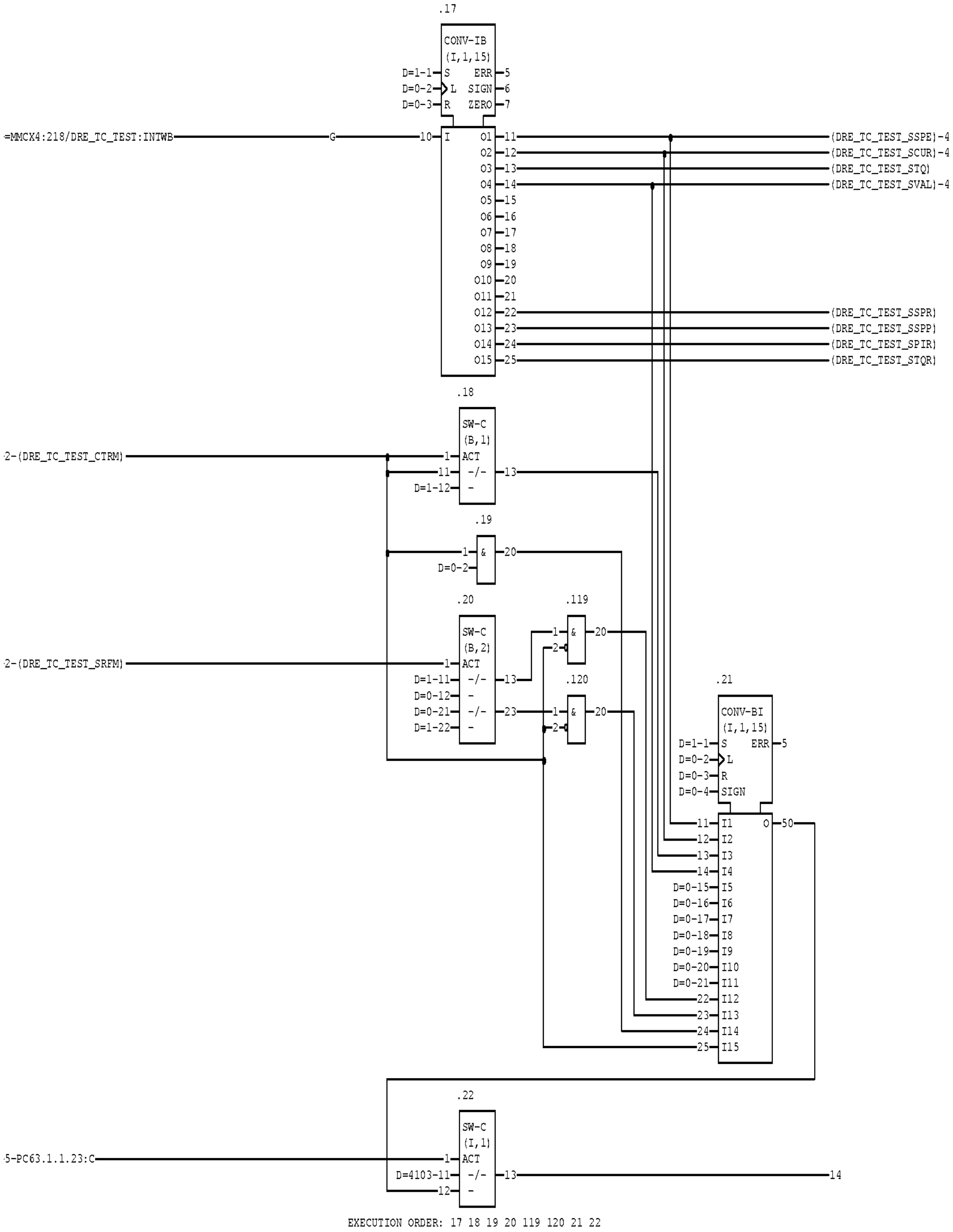


Figure B-4. Sheet 4. Visibility Control

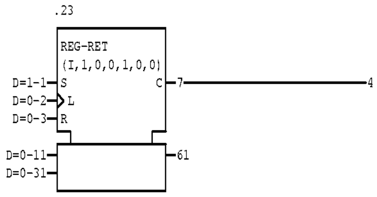


Figure B-5. Sheet 5. Visibility Control

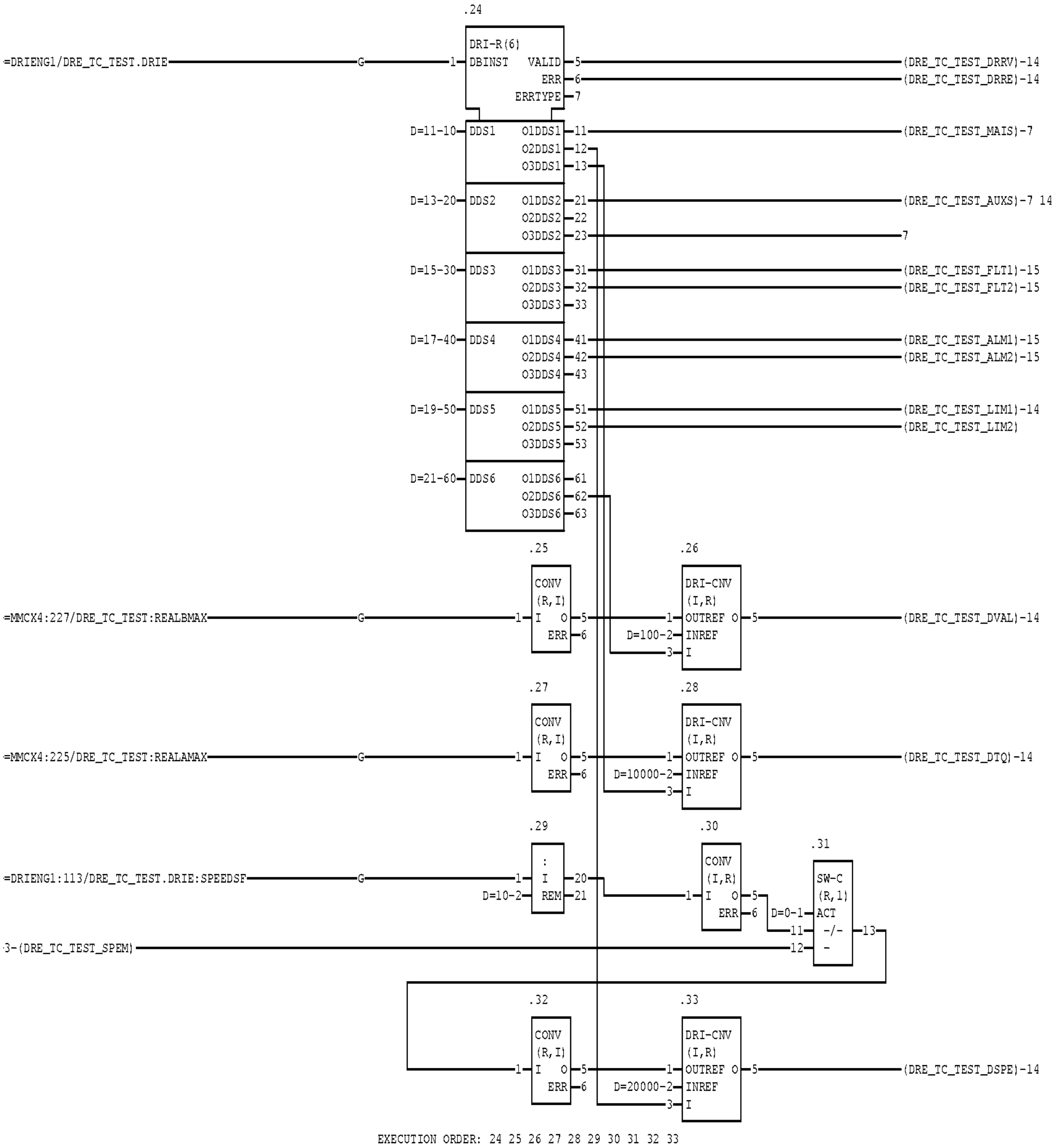


Figure B-6. Sheet 6. Reading from Drive Unit

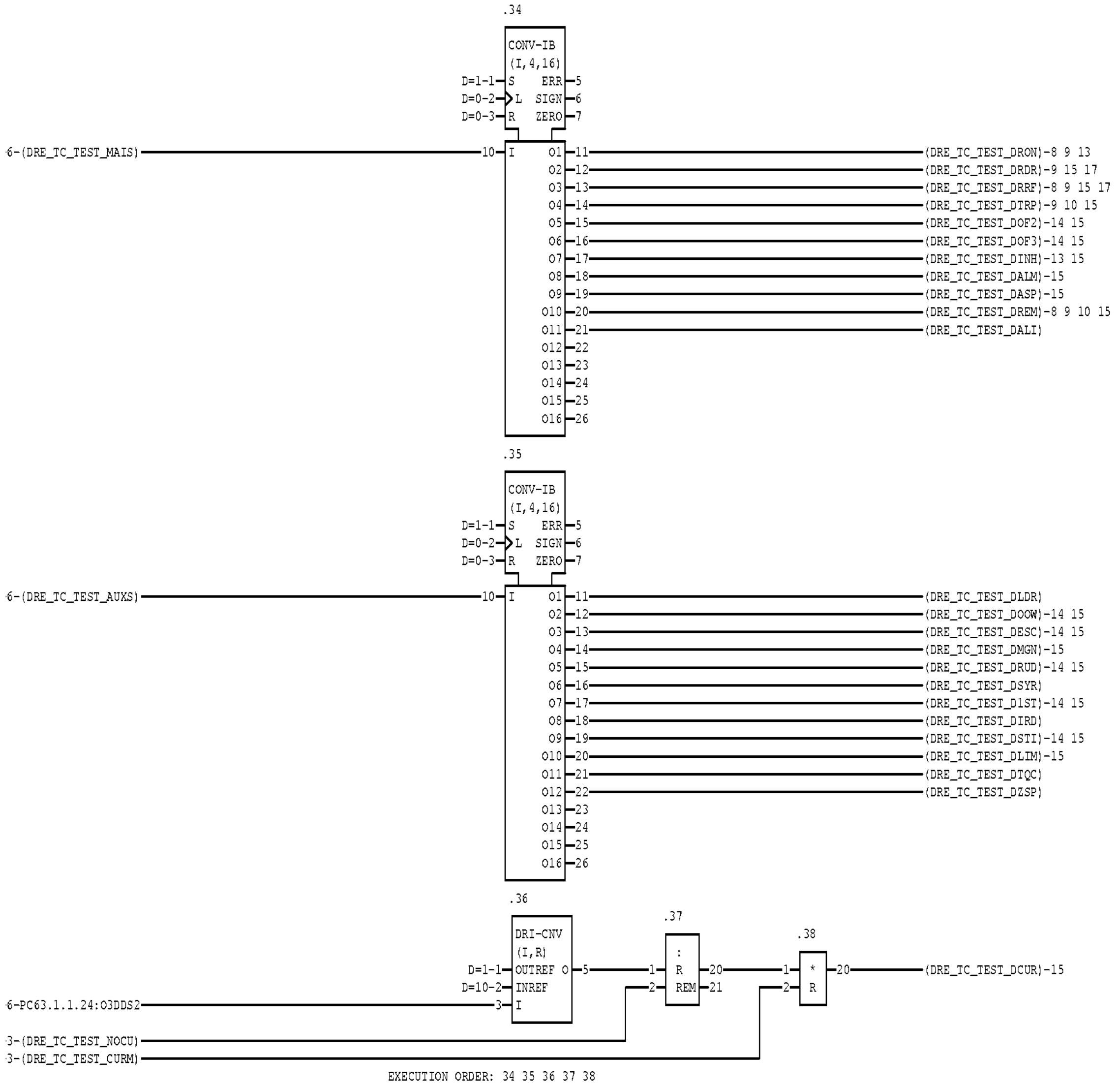

.34
CONV-IB
(I,4,16)
D=1-1- S ERR -5
D=0-2- L SIGN -6
D=0-3- R ZERO -7
6-(DRE_TC_TEST_MAIS)
10- I
O1 -11 (DRE_TC_TEST_DRON)-8 9 13
O2 -12 (DRE_TC_TEST_DRDR)-9 15 17
O3 -13 (DRE_TC_TEST_DRRF)-8 9 15 17
O4 -14 (DRE_TC_TEST_DTRP)-9 10 15
O5 -15 (DRE_TC_TEST_DOF2)-14 15
O6 -16 (DRE_TC_TEST_DOF3)-14 15
O7 -17 (DRE_TC_TEST_DINH)-13 15
O8 -18 (DRE_TC_TEST_DALM)-15
O9 -19 (DRE_TC_TEST_DASP)-15
O10 -20 (DRE_TC_TEST_DREM)-8 9 10 15
O11 -21 (DRE_TC_TEST_DALI)
O12 -22
O13 -23
O14 -24
O15 -25
O16 -26
.35
CONV-IB
(I,4,16)
D=1-1- S ERR -5
D=0-2- L SIGN -6
D=0-3- R ZERO -7
6-(DRE_TC_TEST_AUXS)
10- I
O1 -11 (DRE_TC_TEST_DLDR)
O2 -12 (DRE_TC_TEST_DOOW)-14 15
O3 -13 (DRE_TC_TEST_DESC)-14 15
O4 -14 (DRE_TC_TEST_DMGN)-15
O5 -15 (DRE_TC_TEST_DRUD)-14 15
O6 -16 (DRE_TC_TEST_DSYR)
O7 -17 (DRE_TC_TEST_D1ST)-14 15
O8 -18 (DRE_TC_TEST_DIRD)
O9 -19 (DRE_TC_TEST_DSTI)-14 15
O10 -20 (DRE_TC_TEST_DLIM)-15
O11 -21 (DRE_TC_TEST_DTQC)
O12 -22 (DRE_TC_TEST_DZSP)
O13 -23
O14 -24
O15 -25
O16 -26
.36
DRI-CNV
(I,R)
D=1-1- OUTREF O -5
D=10-2- INREF
6-PC63.1.1.24:O3DDS2
3- I
.37
:
1- R -20
2- REM -21
.38
*
1- R -20
2-
(DRE_TC_TEST_DCUR)-15
3-(DRE_TC_TEST_NOCU)
3-(DRE_TC_TEST_CURM)
EXECUTION ORDER: 34 35 36 37 38

Figure B-7. Sheet 7. Reading from Drive Unit

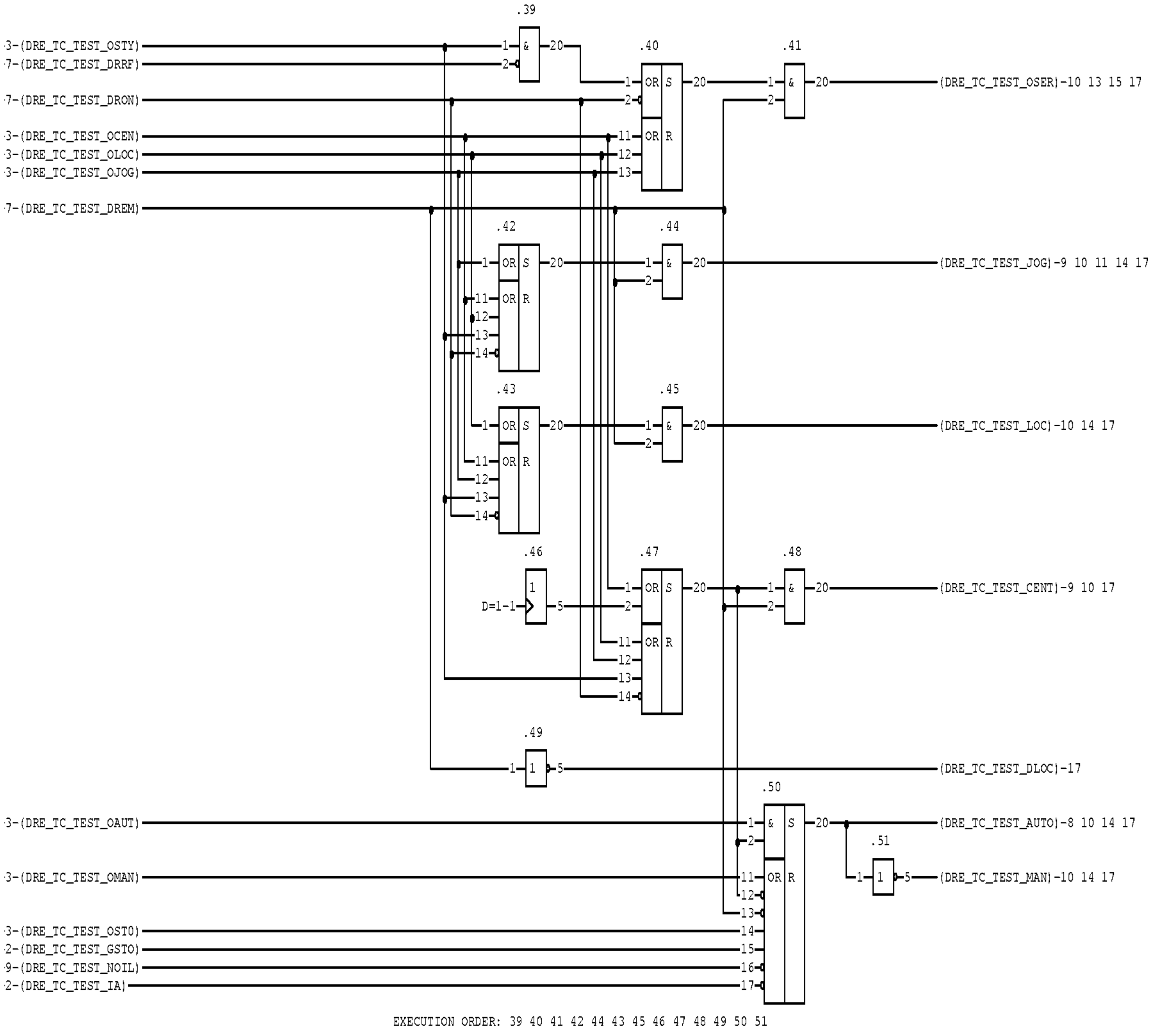


Figure B-8. Sheet 8. Point of Control

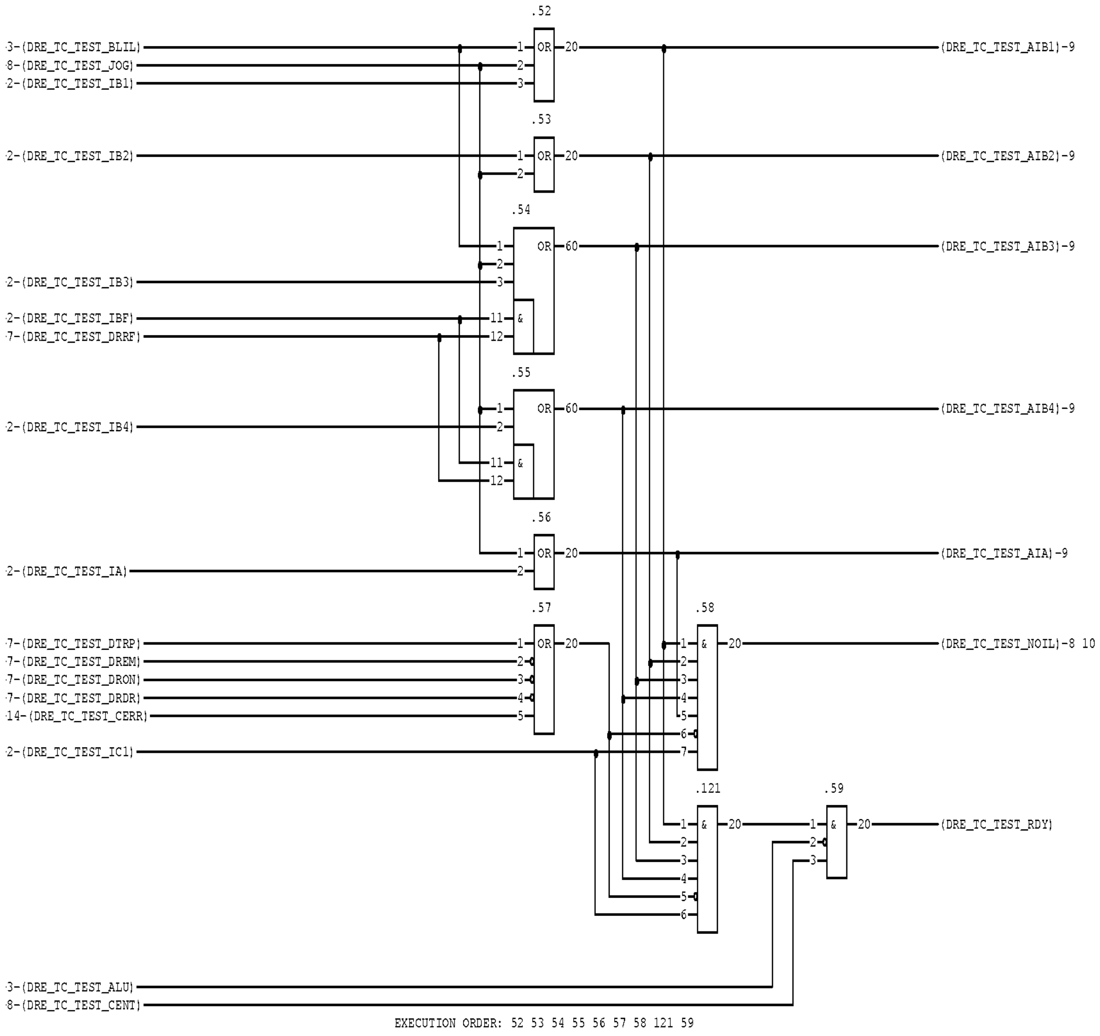


Figure B-9. Sheet 9. Interlocks

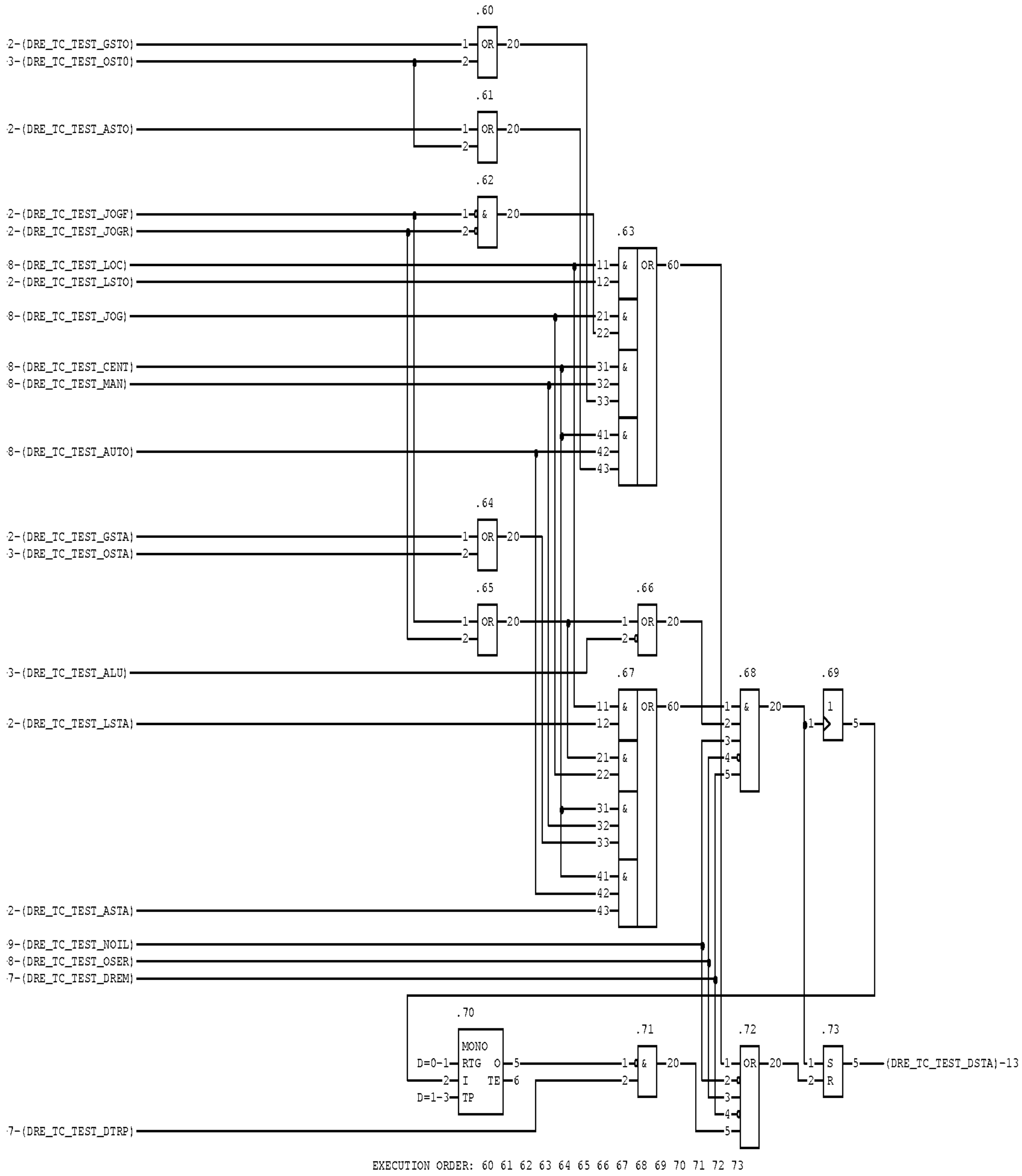


Figure B-10. Sheet 10. Start/Stop

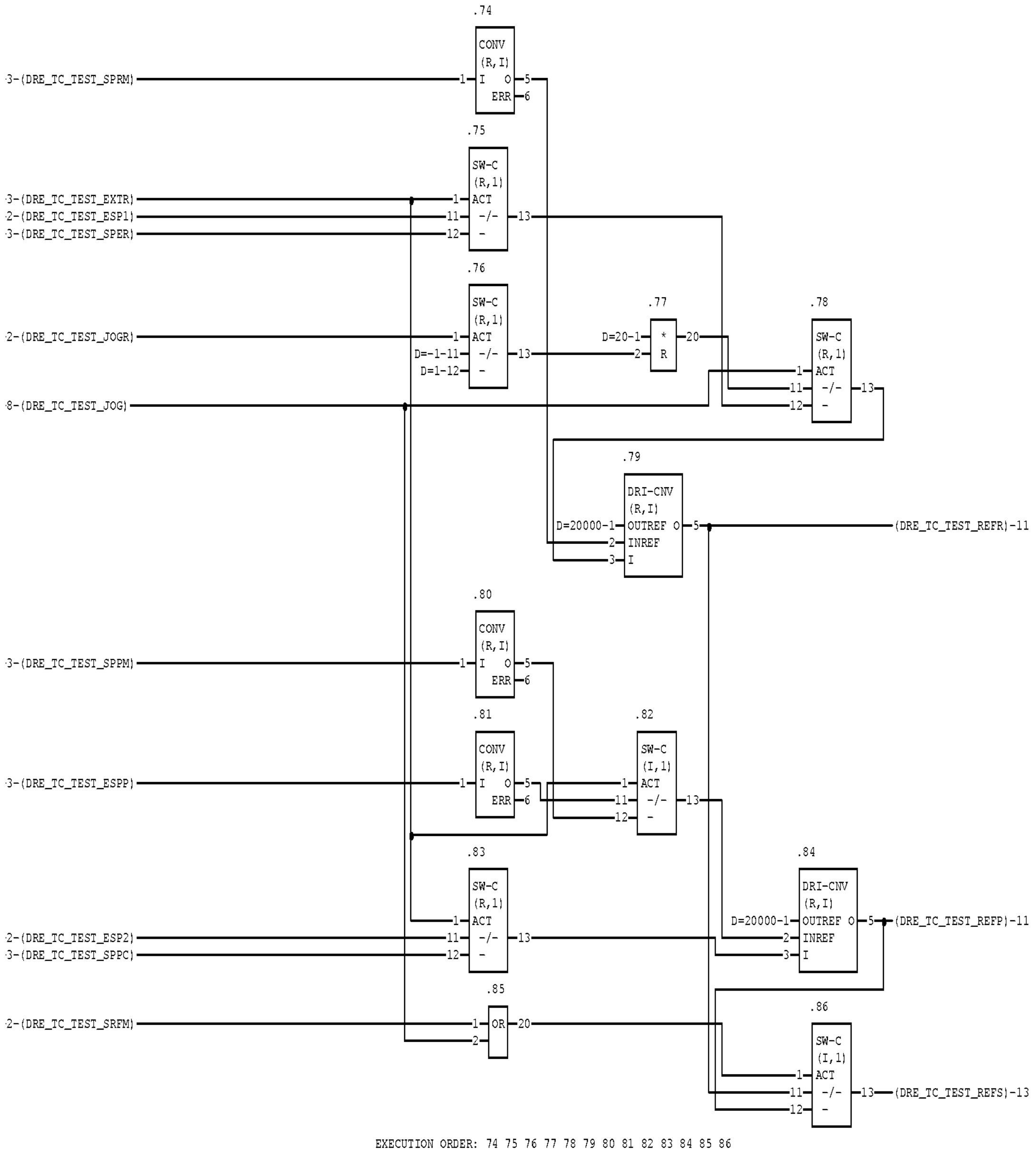


Figure B-11. Sheet 11. Sending to Drive Unit

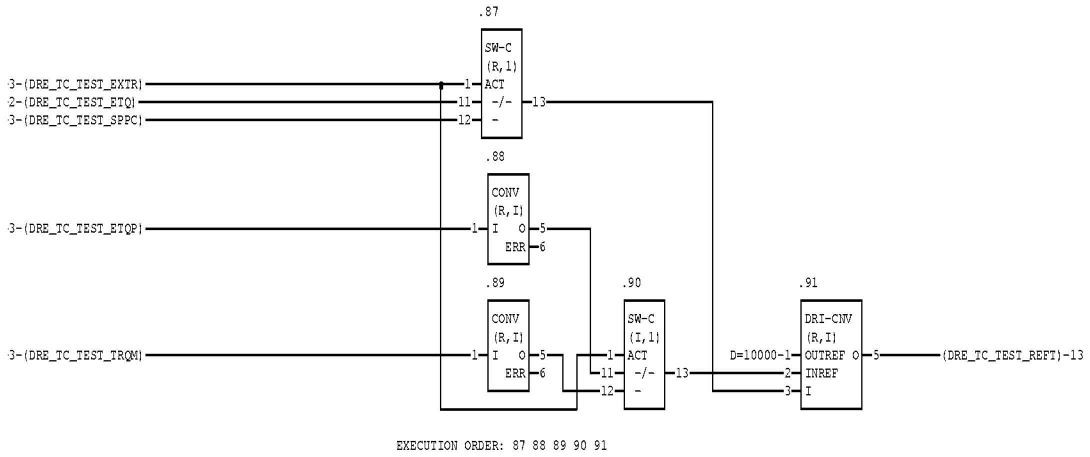


Figure B-12. Sheet 12. Sending to Drive Unit

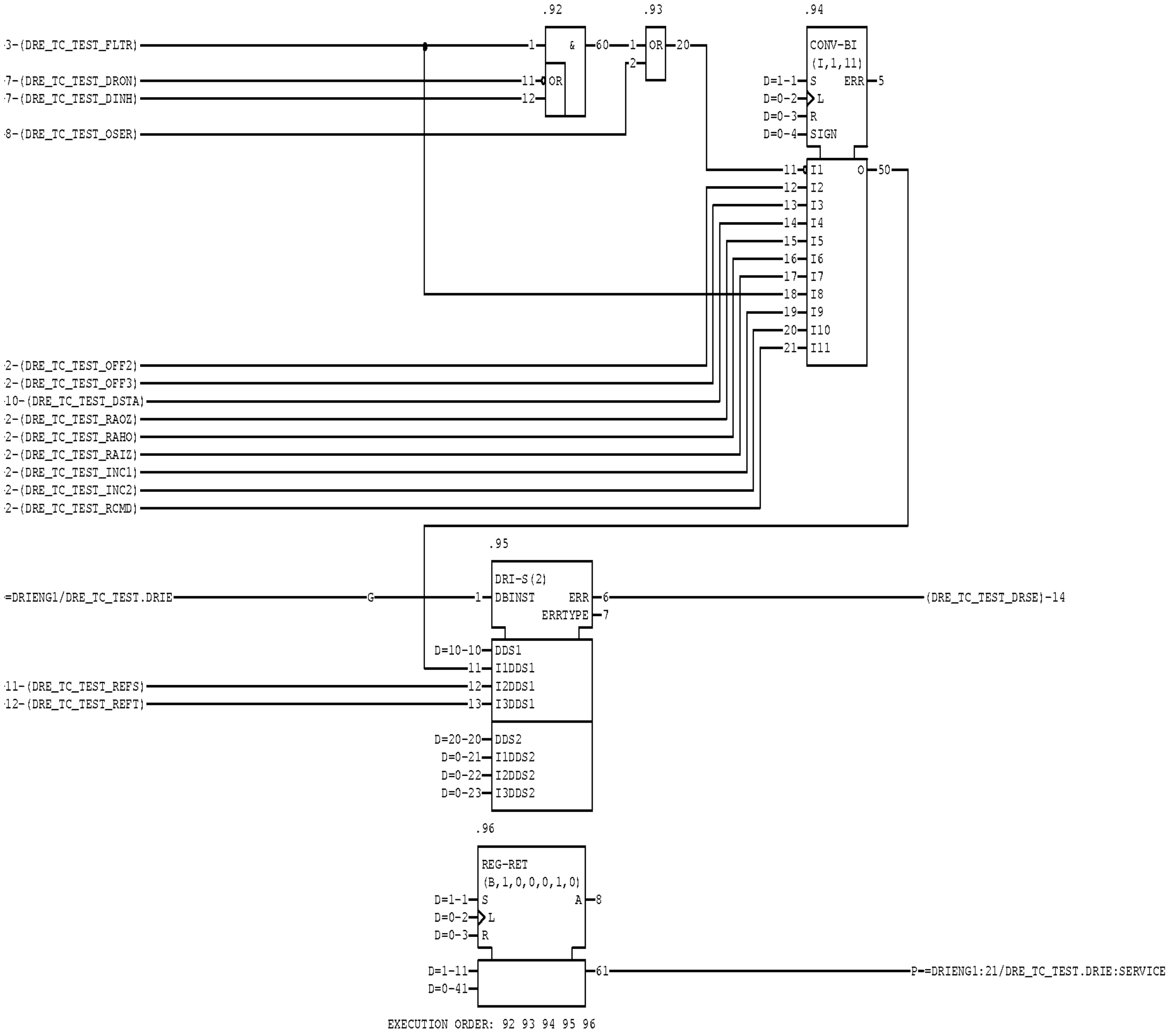


Figure B-13. Sheet 13. Sending to Drive Unit

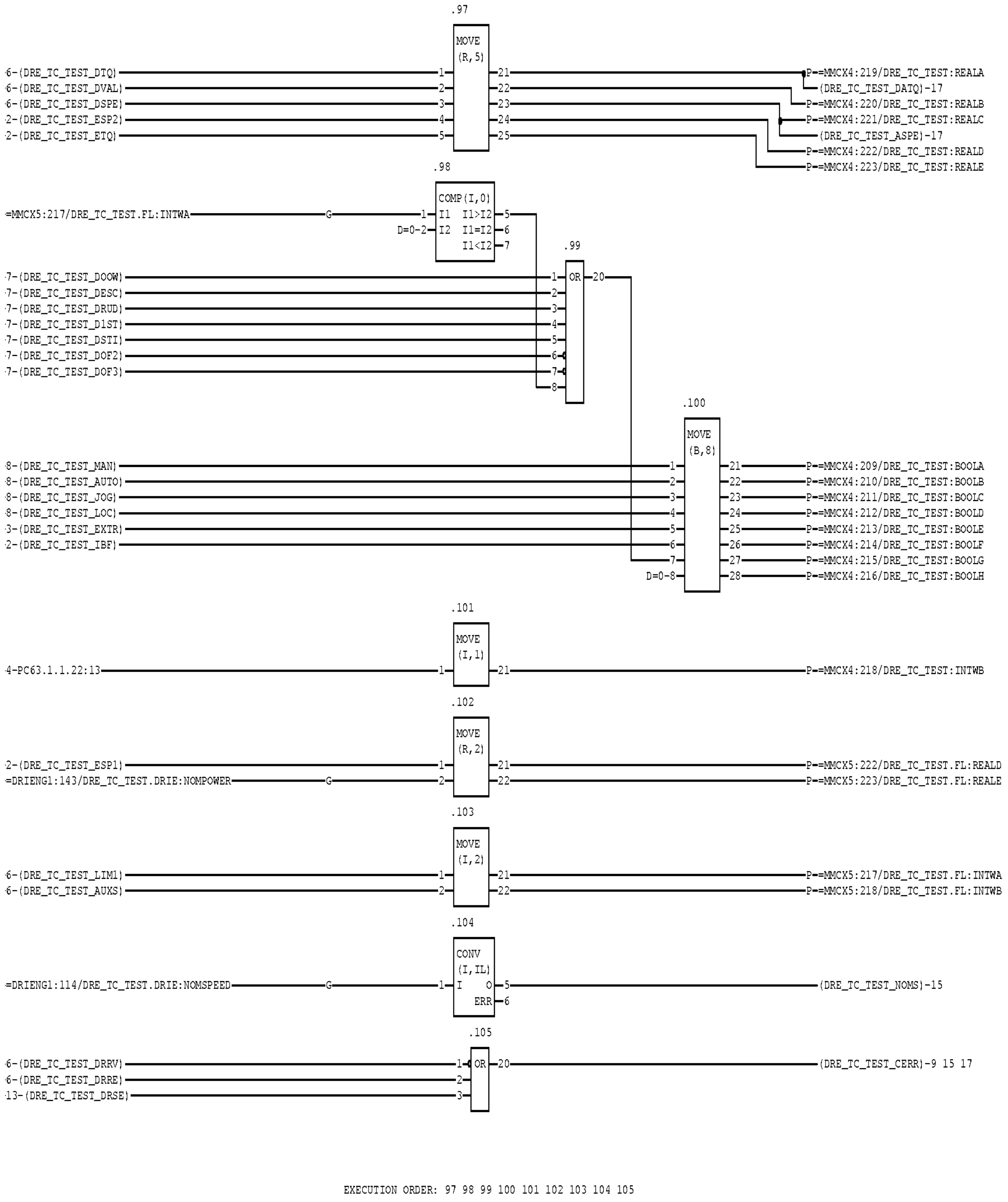


Figure B-14. Sheet 14. Storing Data for Presentation

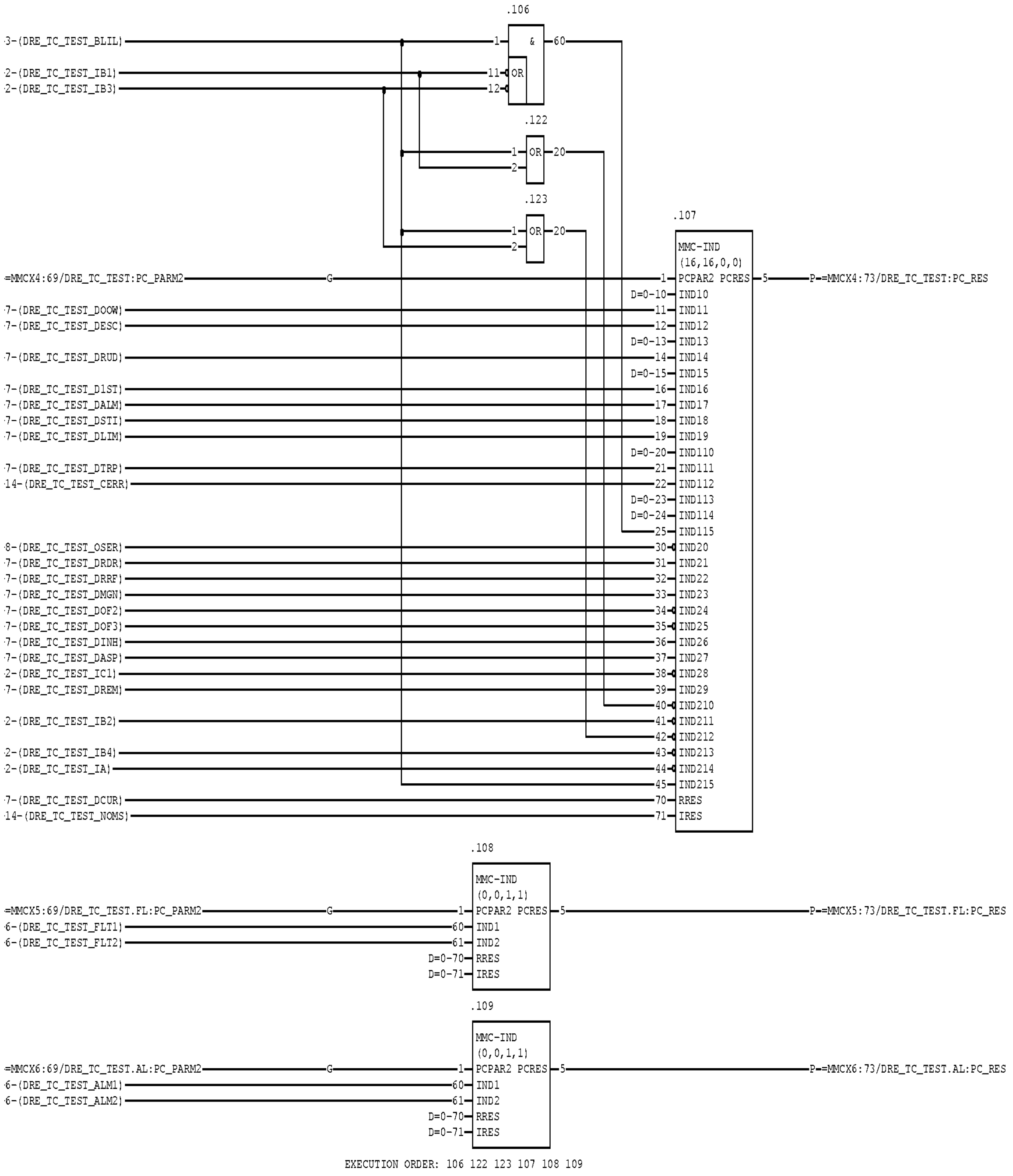

.106
3-(DRE_TC_TEST_BLIL)
2-(DRE_TC_TEST_IB1)
2-(DRE_TC_TEST_IB3)
1
&
60
11
12
OR
.122
1
2
OR
20
.123
1
2
OR
20
.107
MMC-IND
(16,16,0,0)
=MMCX4:69/DRE_TC_TEST:PC_PARM2
G
1
PCPAR2 PCRES
5
P-=MMCX4:73/DRE_TC_TEST:PC_RES
D=0-10 IND10
7-(DRE_TC_TEST_DOOW) 11 IND11
7-(DRE_TC_TEST_DESC) 12 IND12
D=0-13 IND13
7-(DRE_TC_TEST_DRUD) 14 IND14
D=0-15 IND15
7-(DRE_TC_TEST_D1ST) 16 IND16
7-(DRE_TC_TEST_DALM) 17 IND17
7-(DRE_TC_TEST_DSTI) 18 IND18
7-(DRE_TC_TEST_DLIM) 19 IND19
D=0-20 IND110
7-(DRE_TC_TEST_DTRP) 21 IND111
14-(DRE_TC_TEST_CERR) 22 IND112
D=0-23 IND113
D=0-24 IND114
25 IND115
8-(DRE_TC_TEST_OSER) 30 IND20
7-(DRE_TC_TEST_DRDR) 31 IND21
7-(DRE_TC_TEST_DRRF) 32 IND22
7-(DRE_TC_TEST_DMGN) 33 IND23
7-(DRE_TC_TEST_DOF2) 34 IND24
7-(DRE_TC_TEST_DOF3) 35 IND25
7-(DRE_TC_TEST_DINH) 36 IND26
7-(DRE_TC_TEST_DASP) 37 IND27
2-(DRE_TC_TEST_IC1) 38 IND28
7-(DRE_TC_TEST_DREM) 39 IND29
40 IND210
2-(DRE_TC_TEST_IB2) 41 IND211
42 IND212
2-(DRE_TC_TEST_IB4) 43 IND213
2-(DRE_TC_TEST_IA) 44 IND214
45 IND215
7-(DRE_TC_TEST_DCUR) 70 RRES
14-(DRE_TC_TEST_NOMS) 71 IRES
.108
MMC-IND
(0,0,1,1)
=MMCX5:69/DRE_TC_TEST.FL:PC_PARM2
G
1
PCPAR2 PCRES
5
P-=MMCX5:73/DRE_TC_TEST.FL:PC_RES
6-(DRE_TC_TEST_FLT1) 60 IND1
6-(DRE_TC_TEST_FLT2) 61 IND2
D=0-70 RRES
D=0-71 IRES
.109
MMC-IND
(0,0,1,1)
=MMCX6:69/DRE_TC_TEST.AL:PC_PARM2
G
1
PCPAR2 PCRES
5
P-=MMCX6:73/DRE_TC_TEST.AL:PC_RES
6-(DRE_TC_TEST_ALM1) 60 IND1
6-(DRE_TC_TEST_ALM2) 61 IND2
D=0-70 RRES
D=0-71 IRES
EXECUTION ORDER: 106 122 123 107 108 109

Figure B-15. Sheet 15. Storing Data for Presentation

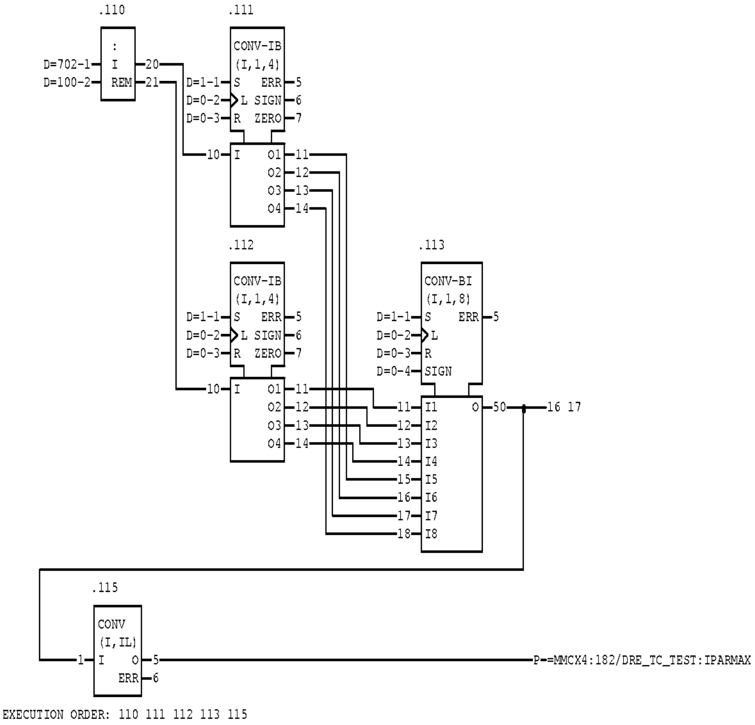


Figure B-16. Sheet 16. Storing Data on Output Terminals

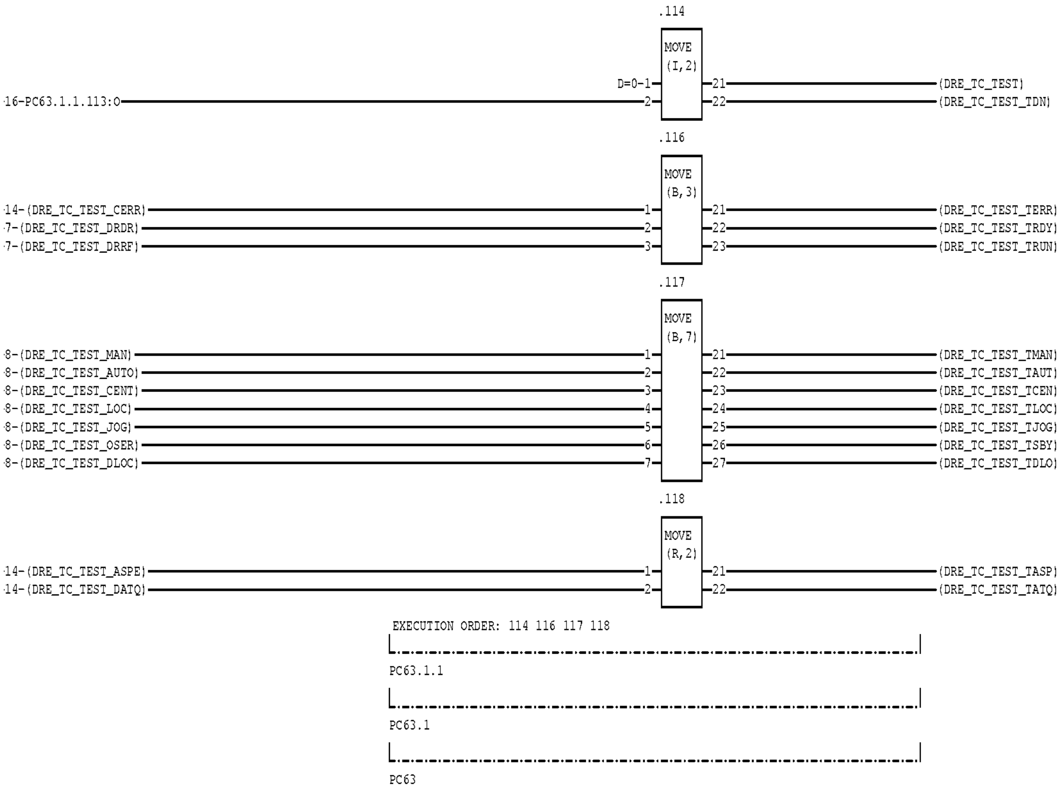


Figure B-17. Sheet 17. Storing Data on Output Terminals

Appendix C PC Diagram DRID1

C.1 Overview Description DRID1

The type circuit is made up of several subfunctions. Each subfunction is located on one or more pages of PC-diagram. Following is a short description of each subfunction, and an overview block diagram showing the interconnections between subfunctions.

- Input terminals.

  All input terminals of the type circuit are connected to MOVE elements. They are grouped as on the type circuit element. All internal connections are made to the outputs of these MOVE-elements.

- Operator interface, input.

  All orders, setpoint values, and so on. are read from the data base. All internal connections are made to the outputs here.

- Visibility.

  The visibility of current values in operator displays are set according to configuration parameters. Visibility is changed according to control mode input.

- Read from drive unit.

  All status and current values are read from the drive unit and converted to real value representation.

- Point of control.

  Operator changes of point of control and status changes in the drive unit are evaluated. The current point of control is changed if appropriate.

- Interlocks.

  Interlock inputs are evaluated. The current interlock status is changed if appropriate.

- Start/stop.

  Operator and input start/stop orders are evaluated. The drive is started or stopped according to point of control and current interlock status.

- Sending to drive unit.

  Orders and setpoint values are sent to the drive unit.

- Operator interface, output.

  All current values, point of control, interlock status and so on, are read from the data base. All internal connections are made to the outputs here.

- Output terminals

  All output terminals of the type circuit are connected to MOVE elements here.
  All internal connections are made to the inputs of these MOVE elements.

C.2 Overview Block Diagram DRID1

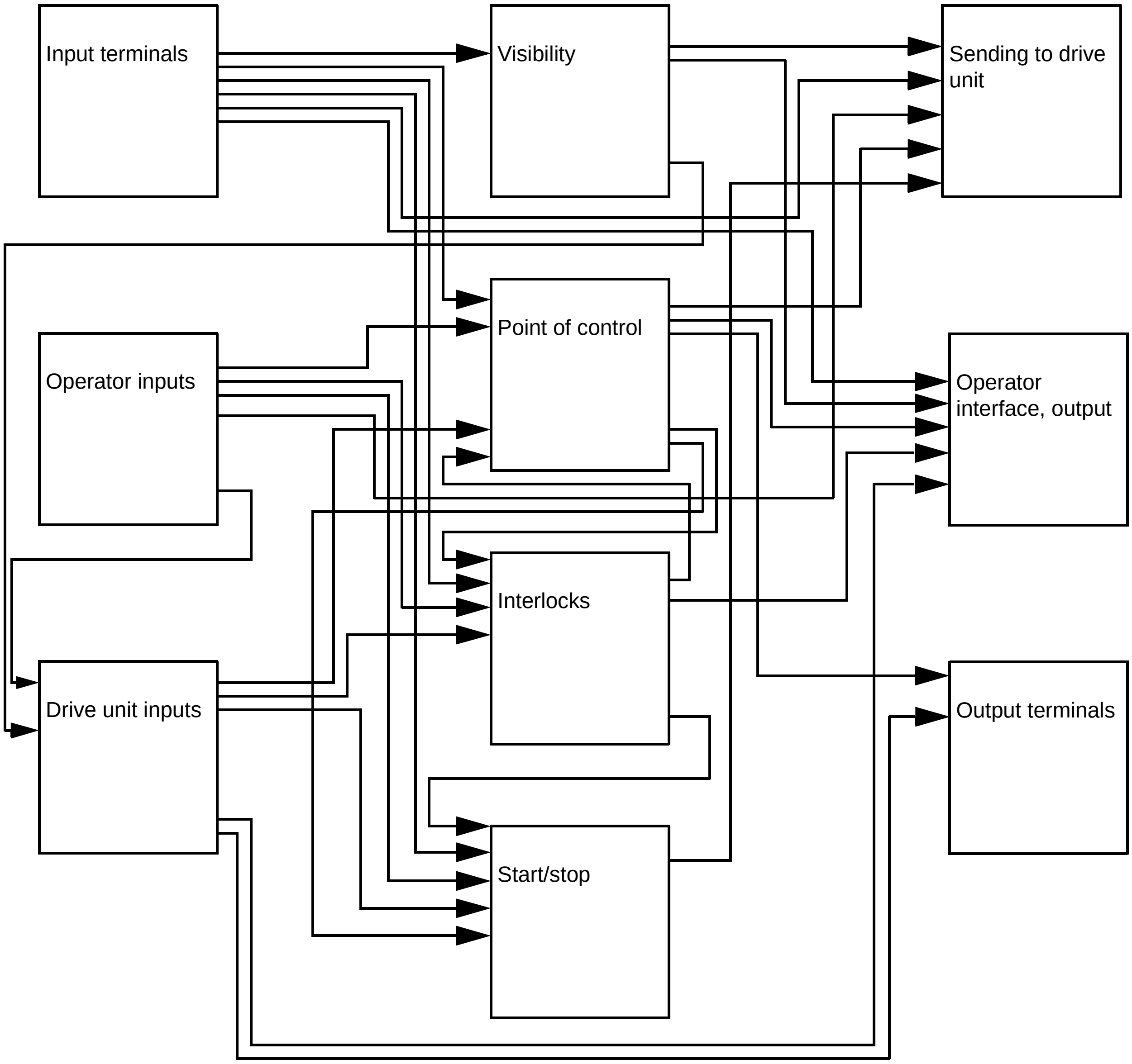


Figure C-1. Overview Diagram DRID1

C.3 Explanation of PC Names DRID1

Table C-1. PC Names DRID1

PC name	Explanation
(<DRIVE_NAME>_AIA)	Sequence interlock A active
(<DRIVE_NAME>_AIB1)	Process interlock B1 active
(<DRIVE_NAME>_AIB2)	Process interlock B2 active
(<DRIVE_NAME>_AIB3)	Process interlock B3 active
(<DRIVE_NAME>_AIB4)	Process interlock B4 active
(<DRIVE_NAME>_ALU)	Unacknowledged alarm
(<DRIVE_NAME>_ASPE)	Actual speed
(<DRIVE_NAME>_ASTA)	Input auto start
(<DRIVE_NAME>_ASTO)	Input auto stop
(<DRIVE_NAME>_ATQ)	Actual torque
(<DRIVE_NAME>_AUTO)	Point of control central auto active
(<DRIVE_NAME>_BLIL)	Block interlocks
(<DRIVE_NAME>_CENT)	Point of control central active
(<DRIVE_NAME>_CERR)	Drive unit communication error
(<DRIVE_NAME>_CTRM)	Drive unit control mode
(<DRIVE_NAME>_CURM)	Current max. value
(<DRIVE_NAME>_DALI)	Drive above limit
(<DRIVE_NAME>_DALM)	Drive alarm
(<DRIVE_NAME>_DATQ)	Terminal actual torque
(<DRIVE_NAME>_DCUR)	Drive current
(<DRIVE_NAME>_DESC)	Drive description
(<DRIVE_NAME>_DIRD)	Drive ID-run completed
(<DRIVE_NAME>_DLDR)	Drive data logger ready
(<DRIVE_NAME>_DLIM)	Drive limiting
(<DRIVE_NAME>_DLOC)	Point of control drive local active
(<DRIVE_NAME>_DOF2)	No OFF2 (emergency off)
(<DRIVE_NAME>_DOF3)	No OFF3 (emergency stop off)

Table C-1. PC Names DRID1 (Continued)

PC name	Explanation
(<DRIVE_NAME>_DRDR)	Drive ready
(<DRIVE_NAME>_DREM)	Drive remote control
(<DRIVE_NAME>_DRON)	Drive ready to switch on
(<DRIVE_NAME>_DRRE)	DRI-R error
(<DRIVE_NAME>_DRRF)	Drive running
(<DRIVE_NAME>_DRRV)	DRI-R valid
(<DRIVE_NAME>_DRSE)	DRI-S error
(<DRIVE_NAME>_DRUD)	Drive run disabled
(<DRIVE_NAME>_DSPE)	Drive actual speed
(<DRIVE_NAME>_DSTA)	Order start drive
(<DRIVE_NAME>_DTQ)	Drive torque
(<DRIVE_NAME>_DTRP)	Drive tripped (fault)
(<DRIVE_NAME>_DVAL)	Drive value
(<DRIVE_NAME>_DZSP)	Drive zero speed
(<DRIVE_NAME>_ESP1)	Input speed ref. in rpm
(<DRIVE_NAME>_ESP2)	Input speed ref. in %
(<DRIVE_NAME>_ESPP)	External speed ref. max. value
(<DRIVE_NAME>_ETQ)	Input torque ref.
(<DRIVE_NAME>_ETQP)	External torque ref. max. value
(<DRIVE_NAME>_EXTR)	Operator order external reference
(<DRIVE_NAME>_FLTR)	Fault reset
(<DRIVE_NAME>_GSTA)	Input group start
(<DRIVE_NAME>_GSTO)	Input group stop
(<DRIVE_NAME>_IA)	Input sequence interlock A
(<DRIVE_NAME>_IB1)	Input process interlock B1
(<DRIVE_NAME>_IB2)	Input process interlock B2
(<DRIVE_NAME>_IB3)	Input process interlock B3
(<DRIVE_NAME>_IB4)	Input process interlock B4
(<DRIVE_NAME>_IBF)	Input select start/operation interlock

Table C-1. PC Names DRID1 (Continued)

PC name	Explanation
(<DRIVE_NAME>_IC1)	Input process interlock C1
(<DRIVE_NAME>_JOG)	Point of control jog active
(<DRIVE_NAME>_JOGF)	Input jog forward
(<DRIVE_NAME>_JOGR)	Input jog reverse
(<DRIVE_NAME>_LOC)	Point of control local active
(<DRIVE_NAME>_LSTA)	Input local start
(<DRIVE_NAME>_LSTO)	Input local stop
(<DRIVE_NAME>_MAN)	Point of control central man active
(<DRIVE_NAME>_NOCU)	Nominal current
(<DRIVE_NAME>_NOIL)	No active interlocks
(<DRIVE_NAME>_NOMS)	Nominal speed
(<DRIVE_NAME>_OAUT)	Operator order auto
(<DRIVE_NAME>_OCEN)	Operator order central
(<DRIVE_NAME>_OFF3)	Input OFF3
(<DRIVE_NAME>_OJOG)	Operator order jog
(<DRIVE_NAME>_OLOC)	Operator order local
(<DRIVE_NAME>_OMAN)	Operator order man
(<DRIVE_NAME>_OSER)	Point of control out of service active
(<DRIVE_NAME>_OSTA)	Operator order start
(<DRIVE_NAME>_OSTO)	Operator order stop
(<DRIVE_NAME>_OSTY)	Operator order out of service
(<DRIVE_NAME>_RAHO)	Input ramp hold
(<DRIVE_NAME>_RAIZ)	Input ramp input zero
(<DRIVE_NAME>_RAOZ)	Input ramp output zero
(<DRIVE_NAME>_RCMD)	Input remote command
(<DRIVE_NAME>_RDY)	Drive ready
(<DRIVE_NAME>_REFP)	Order reference in %
(<DRIVE_NAME>_REFR)	Order reference in rpm
(<DRIVE_NAME>_REFS)	Order reference speed

Table C-1. PC Names DRID1 (Continued)

PC name	Explanation
(<DRIVE_NAME>_REFT)	Order reference torque
(<DRIVE_NAME>_SCUR)	Visibility, show current
(<DRIVE_NAME>_SPEM)	Actual speed max. value
(<DRIVE_NAME>_SPER)	Operator order speed setpoint in rpm
(<DRIVE_NAME>_SPPC)	Operator order setpoint in %
(<DRIVE_NAME>_SPPM)	Setpoint max. in %
(<DRIVE_NAME>_SPRM)	Speed setpoint max. in rpm
(<DRIVE_NAME>_SRFM)	Input speed reference mode
(<DRIVE_NAME>_SSPE)	Visibility, show speed
(<DRIVE_NAME>_SSPP)	Visibility, show speed in %
(<DRIVE_NAME>_SSPR)	Visibility, show speed in rpm
(<DRIVE_NAME>_STQ)	Visibility, show torque
(<DRIVE_NAME>_STQR)	Visibility, show torque reference
(<DRIVE_NAME>_SVAL)	Visibility, show actual value
(<DRIVE_NAME>_TASP)	Terminal actual speed
(<DRIVE_NAME>_TAUT)	Terminal auto
(<DRIVE_NAME>_TCEN)	Terminal central
(<DRIVE_NAME>_TDLO)	Terminal drive local
(<DRIVE_NAME>_TDNR)	Terminal drive address
(<DRIVE_NAME>_TERR)	Terminal error
(<DRIVE_NAME>_TJOG)	Terminal jog
(<DRIVE_NAME>_TLOC)	Terminal local
(<DRIVE_NAME>_TMAN)	Terminal man
(<DRIVE_NAME>_TRDY)	Terminal ready
(<DRIVE_NAME>_TRQM)	Torque max. value
(<DRIVE_NAME>_TRUN)	Terminal running
(<DRIVE_NAME>_TSBY)	Terminal out of service
(<DRIVE_NAME>_VALM)	Value max. value

C.4 Detailed PC Diagram DRID1

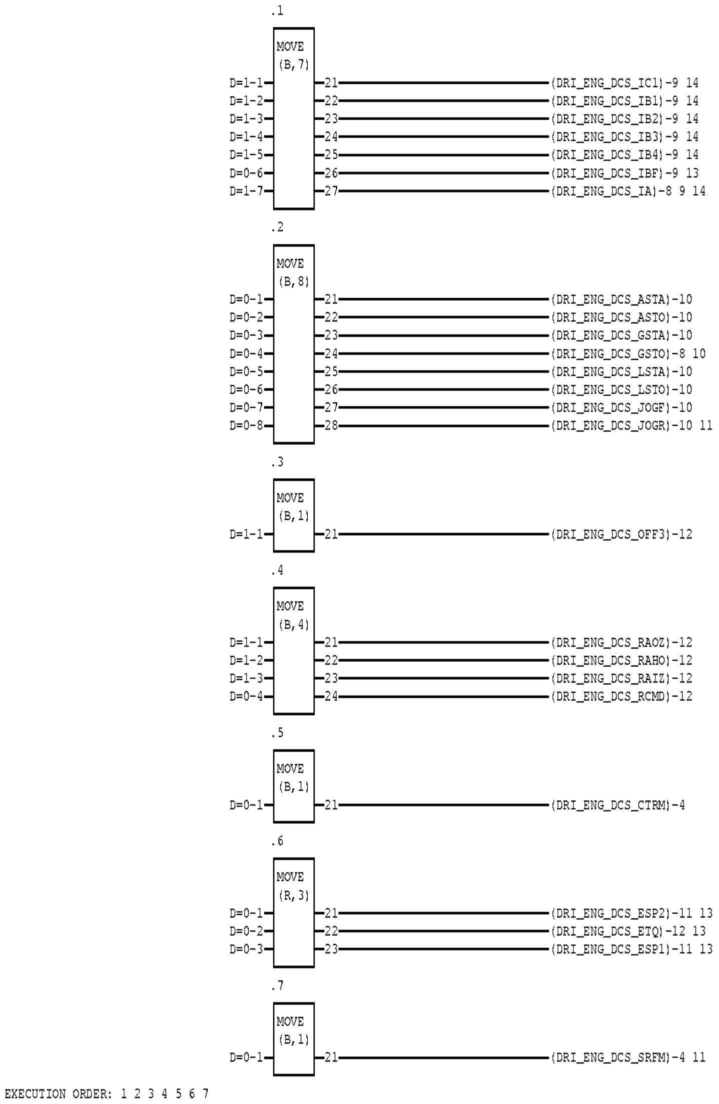


Figure C-2. Sheet 2. Reading Data from Input Terminals

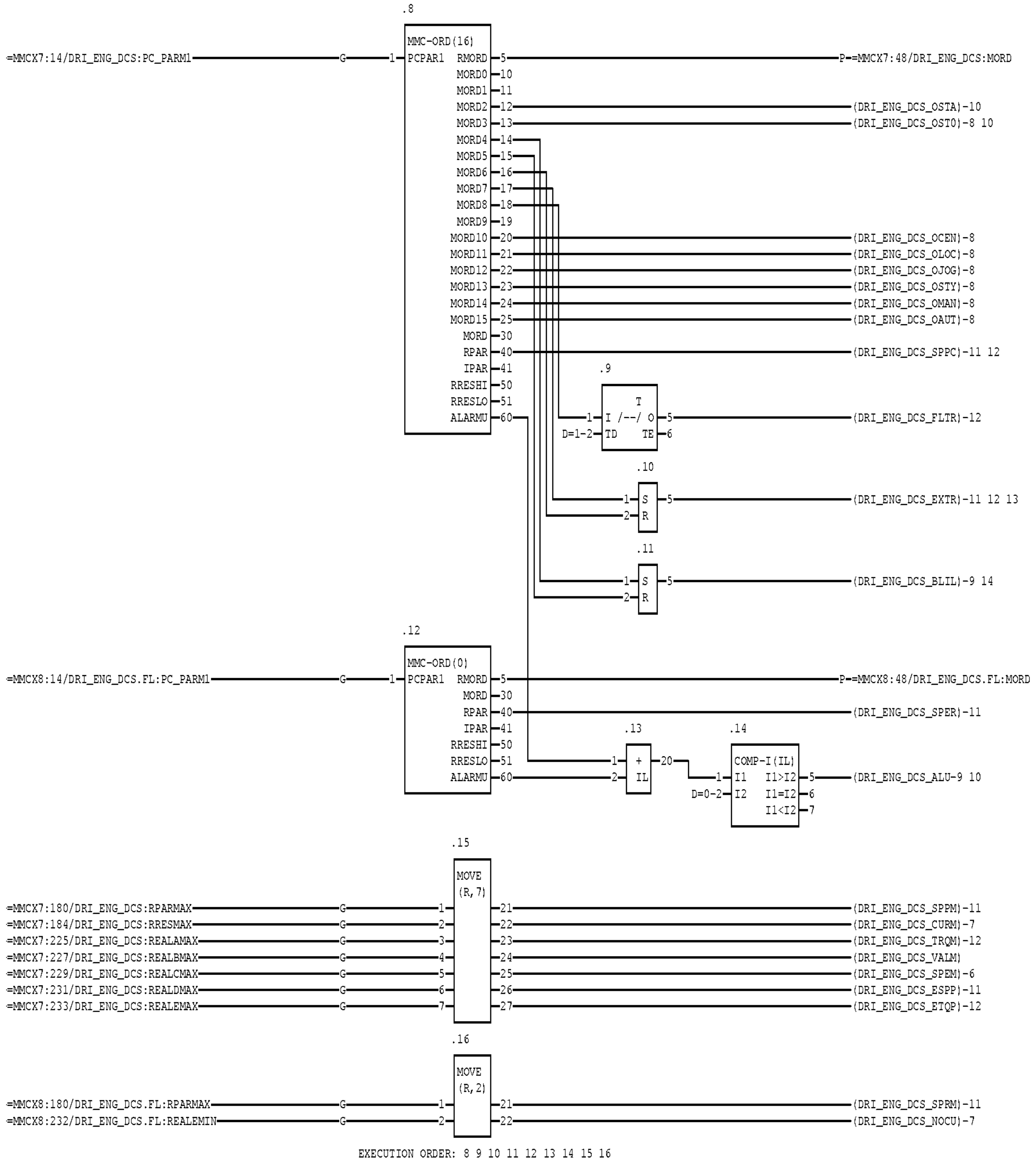

.8
MMC-ORD(16)
=MMCX7:14/DRI_ENG_DCS:PC_PARM1
G
1
PCPAR1
RMORD 5
P-=MMCX7:48/DRI_ENG_DCS:MORD
MORD0 10
MORD1 11
MORD2 12
(DRI_ENG_DCS_OSTA)-10
MORD3 13
(DRI_ENG_DCS_OSTO)-8 10
MORD4 14
MORD5 15
MORD6 16
MORD7 17
MORD8 18
MORD9 19
MORD10 20
(DRI_ENG_DCS_OCEN)-8
MORD11 21
(DRI_ENG_DCS_OLOC)-8
MORD12 22
(DRI_ENG_DCS_OJOG)-8
MORD13 23
(DRI_ENG_DCS_OSTY)-8
MORD14 24
(DRI_ENG_DCS_OMAN)-8
MORD15 25
(DRI_ENG_DCS_OAUT)-8
MORD 30
RPAR 40
(DRI_ENG_DCS_SPPC)-11 12
IPAR 41
RRESHI 50
RRESLO 51
ALARMU 60
.9
T
1 I /--/ O 5
D=1-2 TD TE 6
(DRI_ENG_DCS_FLTR)-12
.10
1 S 5
2 R
(DRI_ENG_DCS_EXTR)-11 12 13
.11
1 S 5
2 R
(DRI_ENG_DCS_BLIL)-9 14
.12
MMC-ORD(0)
=MMCX8:14/DRI_ENG_DCS.FL:PC_PARM1
G
1
PCPAR1
RMORD 5
P-=MMCX8:48/DRI_ENG_DCS.FL:MORD
MORD 30
RPAR 40
(DRI_ENG_DCS_SPER)-11
IPAR 41
RRESHI 50
RRESLO 51
ALARMU 60
.13
1 + 20
2 IL
.14
COMP-I(IL)
1 I1 I1>I2 5
D=0-2 I2 I1=I2 6
I1<I2 7
(DRI_ENG_DCS_ALU-9 10
.15
MOVE
(R,7)
=MMCX7:180/DRI_ENG_DCS:RPARMAX G 1 21 (DRI_ENG_DCS_SPPM)-11
=MMCX7:184/DRI_ENG_DCS:RRESMAX G 2 22 (DRI_ENG_DCS_CURM)-7
=MMCX7:225/DRI_ENG_DCS:REALAMAX G 3 23 (DRI_ENG_DCS_TRQM)-12
=MMCX7:227/DRI_ENG_DCS:REALBMAX G 4 24 (DRI_ENG_DCS_VALM)
=MMCX7:229/DRI_ENG_DCS:REALCMAX G 5 25 (DRI_ENG_DCS_SPEM)-6
=MMCX7:231/DRI_ENG_DCS:REALDMAX G 6 26 (DRI_ENG_DCS_ESPP)-11
=MMCX7:233/DRI_ENG_DCS:REALEMAX G 7 27 (DRI_ENG_DCS_ETQP)-12
.16
MOVE
(R,2)
=MMCX8:180/DRI_ENG_DCS.FL:RPARMAX G 1 21 (DRI_ENG_DCS_SPRM)-11
=MMCX8:232/DRI_ENG_DCS.FL:REALEMIN G 2 22 (DRI_ENG_DCS_NOCU)-7
EXECUTION ORDER: 8 9 10 11 12 13 14 15 16

Figure C-3. Sheet 3. Reading from Dialog

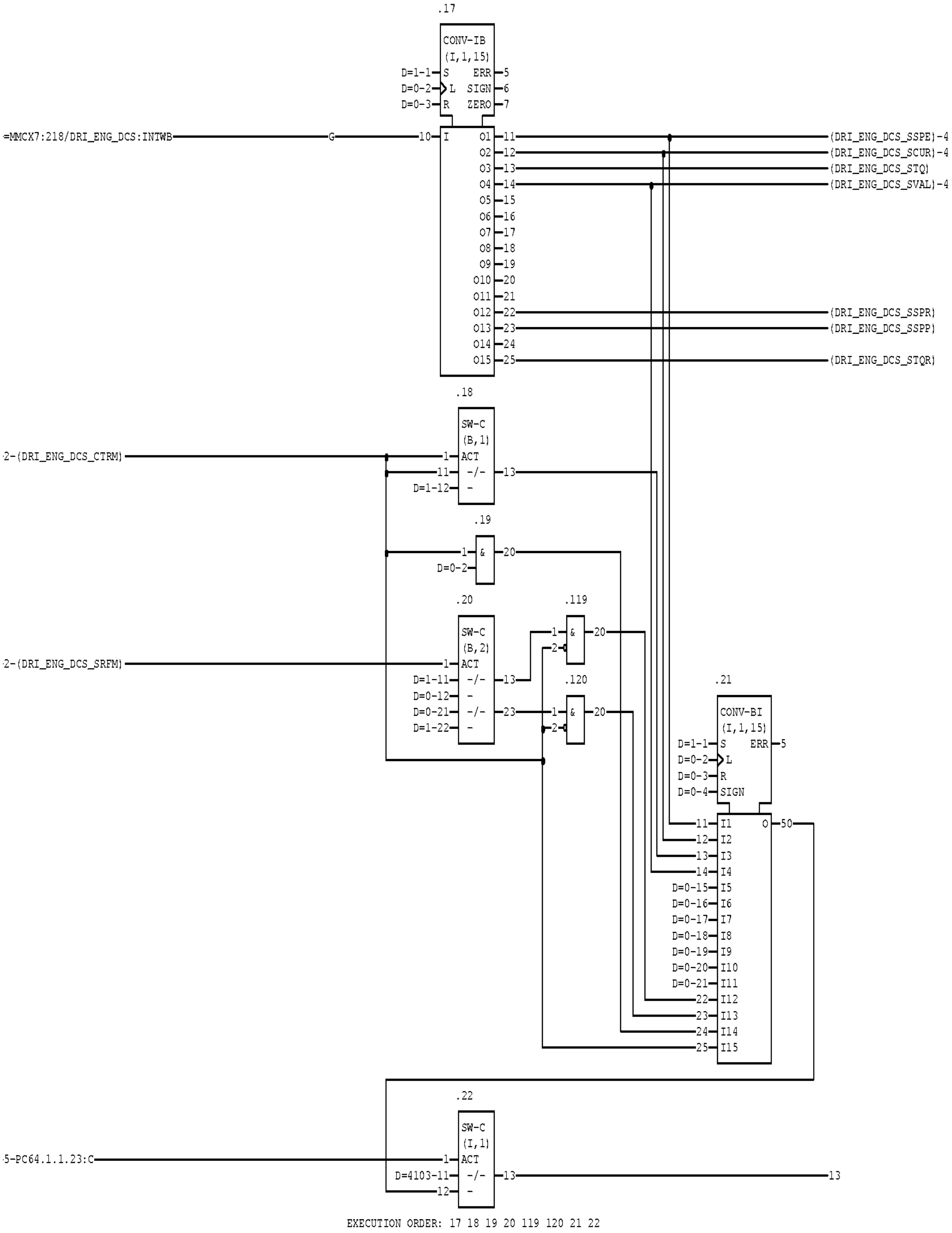


Figure C-4. Sheet 4. Visibility Control

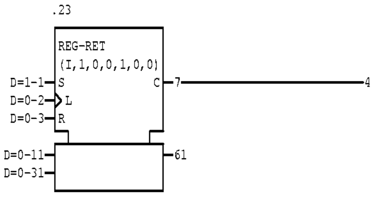


Figure C-5. Sheet 5. Visibility Control

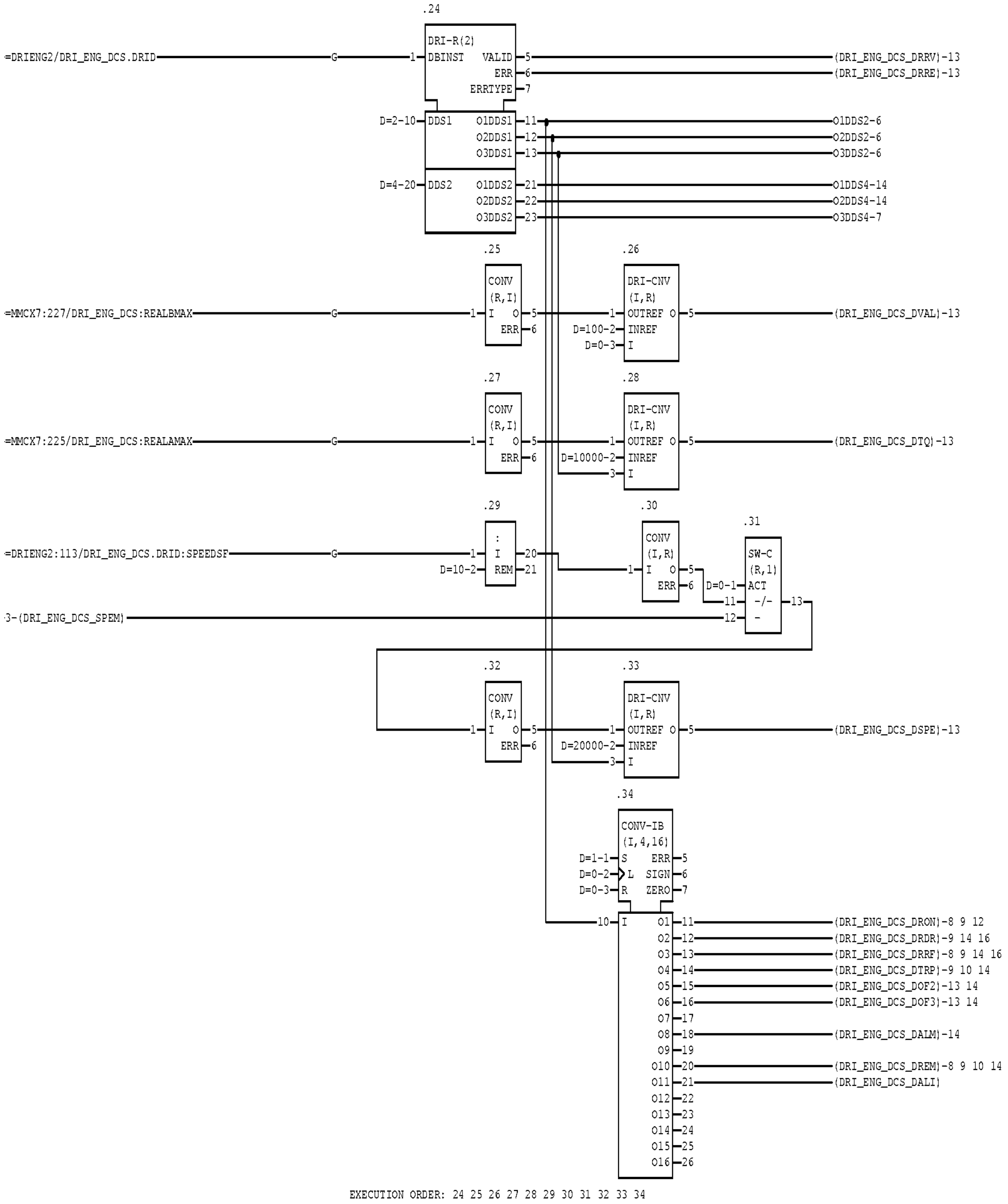


Figure C-6. Sheet 6. Reading from Drive Unit

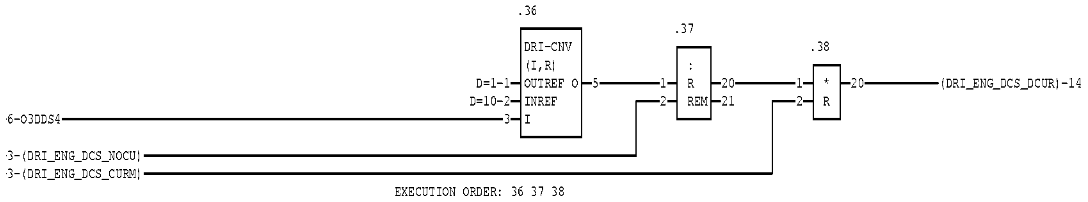


Figure C-7. Sheet 7. Reading from Drive Unit

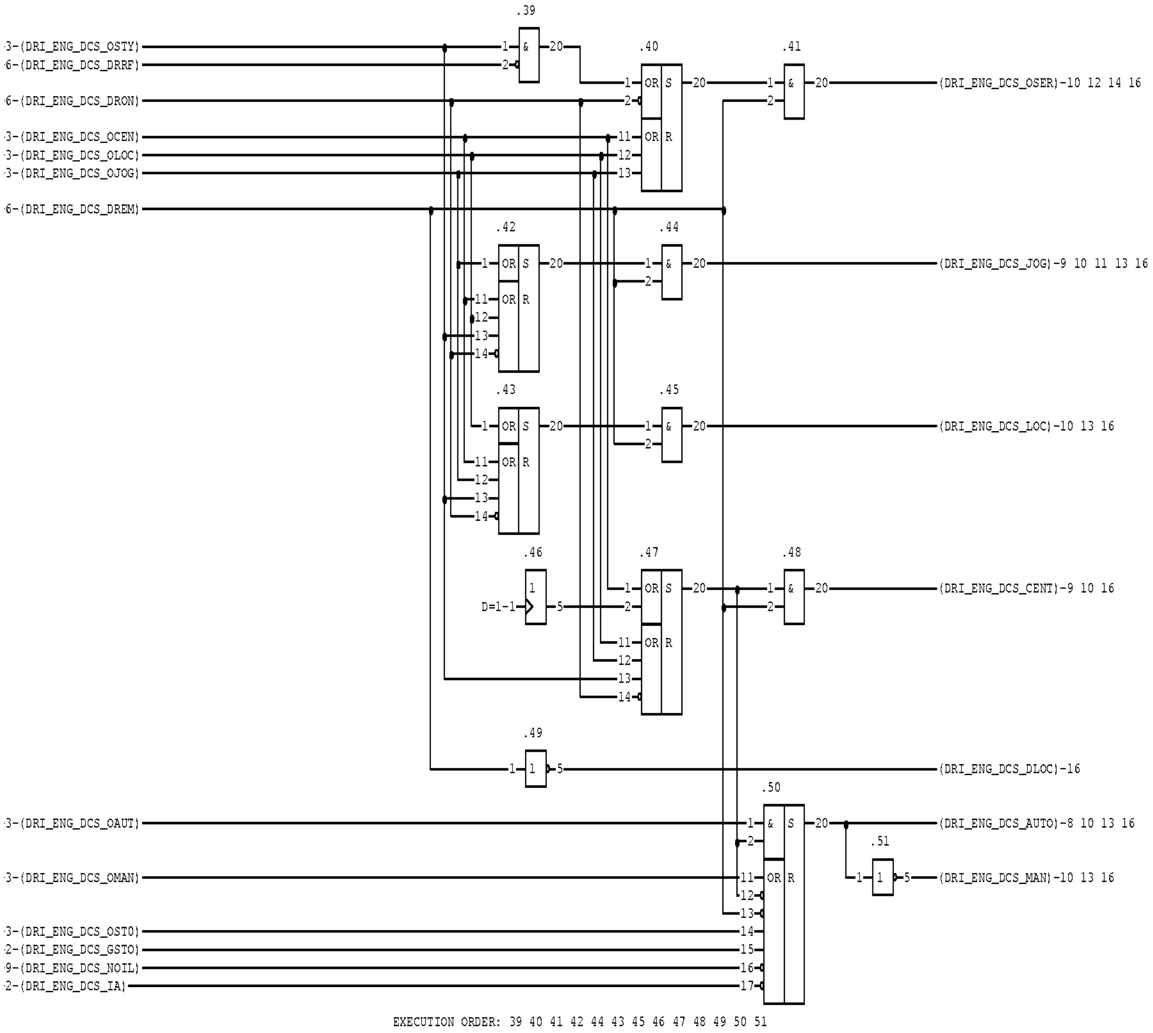


Figure C-8. Sheet 8. Point of Control

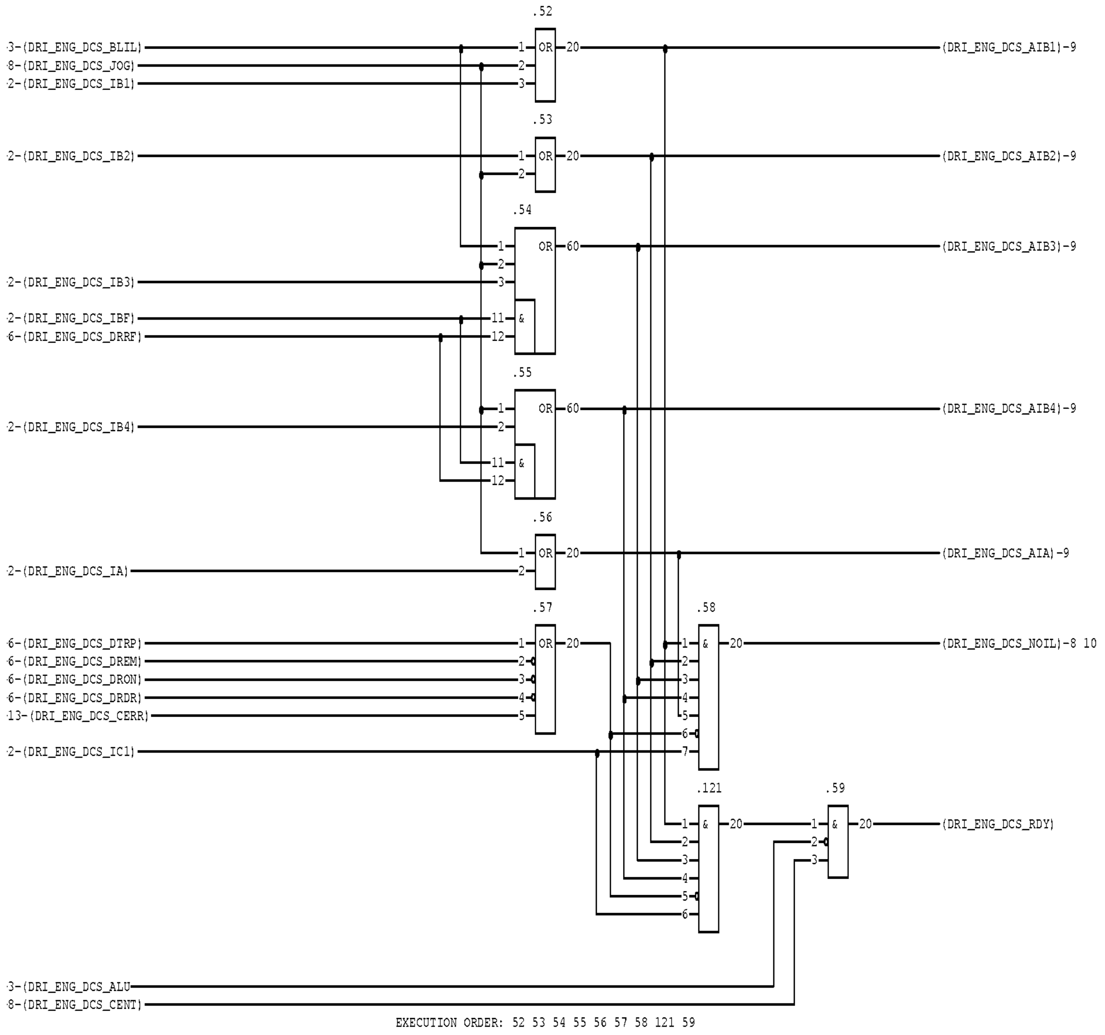


Figure C-9. Sheet 9. Interlocks

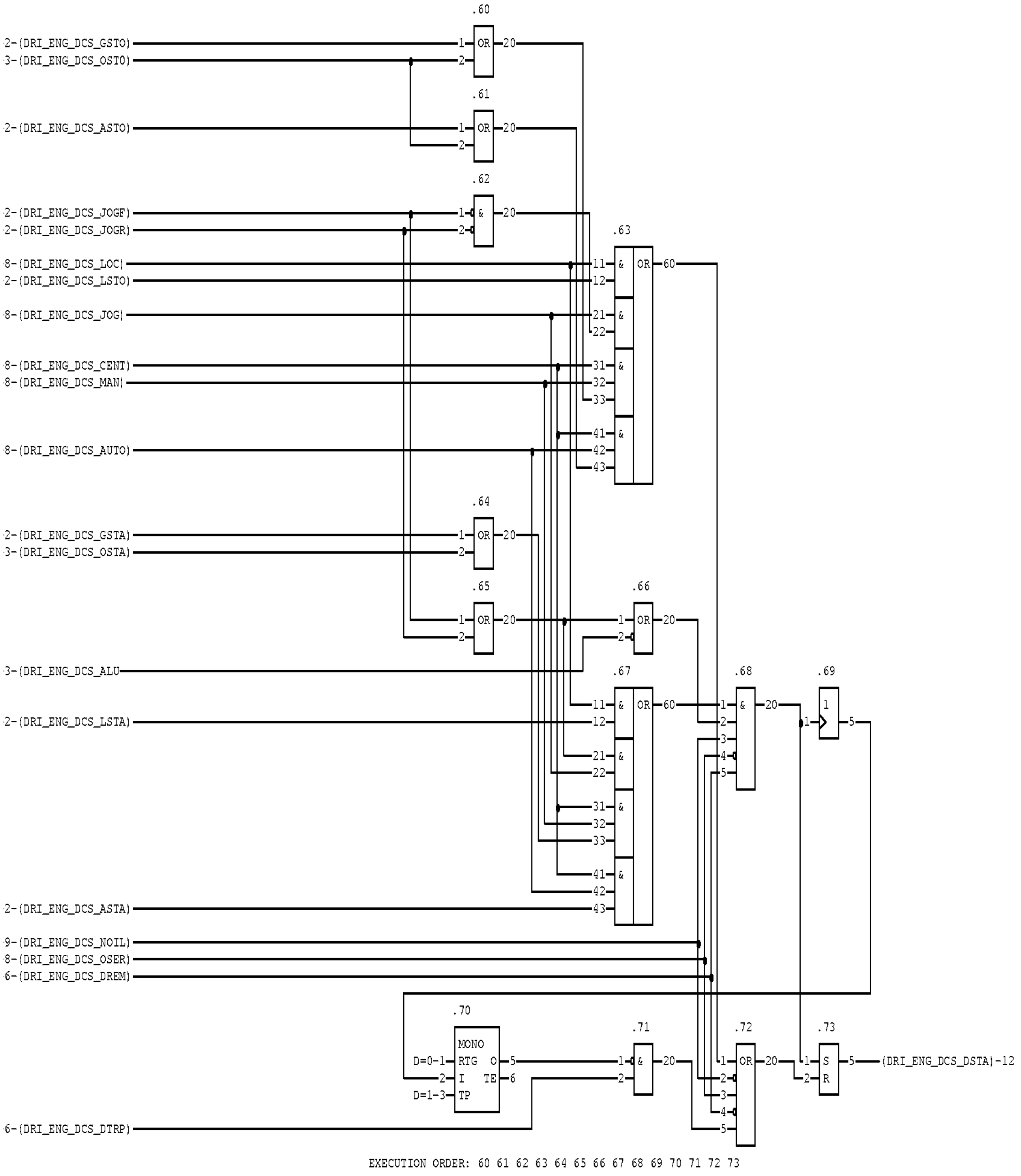


Figure C-10. Sheet 10. Start/Stop

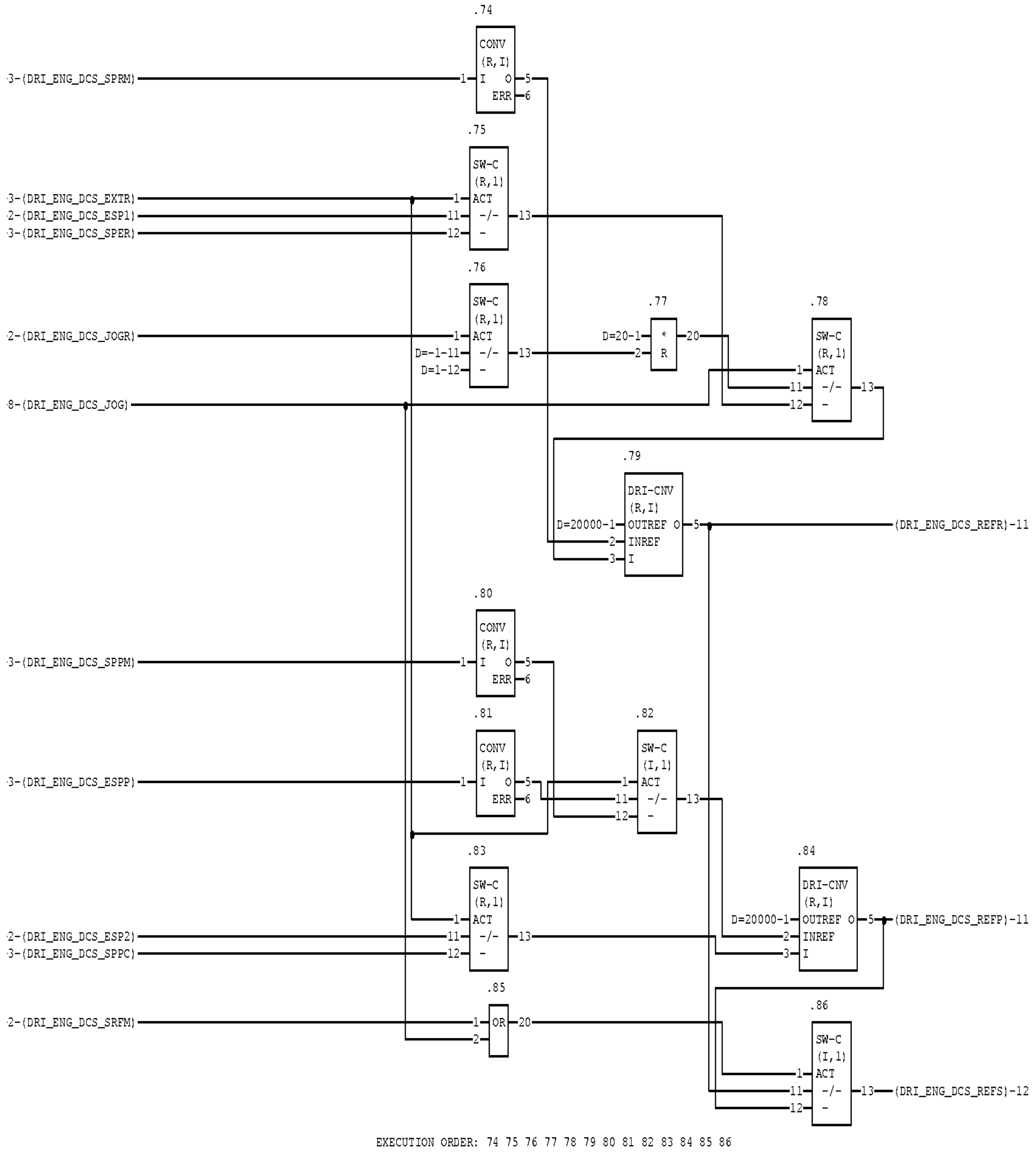


Figure C-11. Sheet 11. Sending to Drive Unit

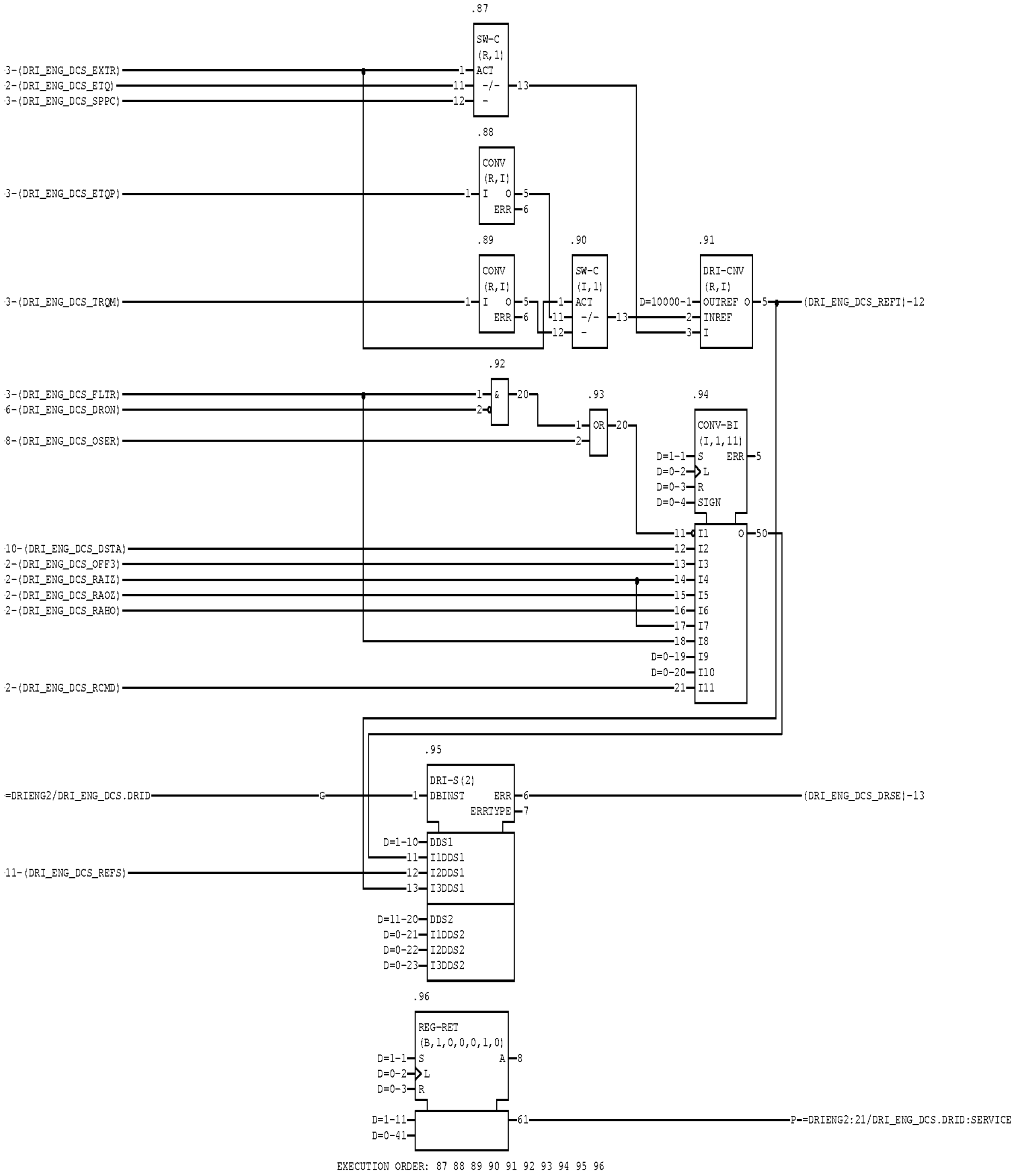


Figure C-12. Sheet 12. Sending to Drive Unit

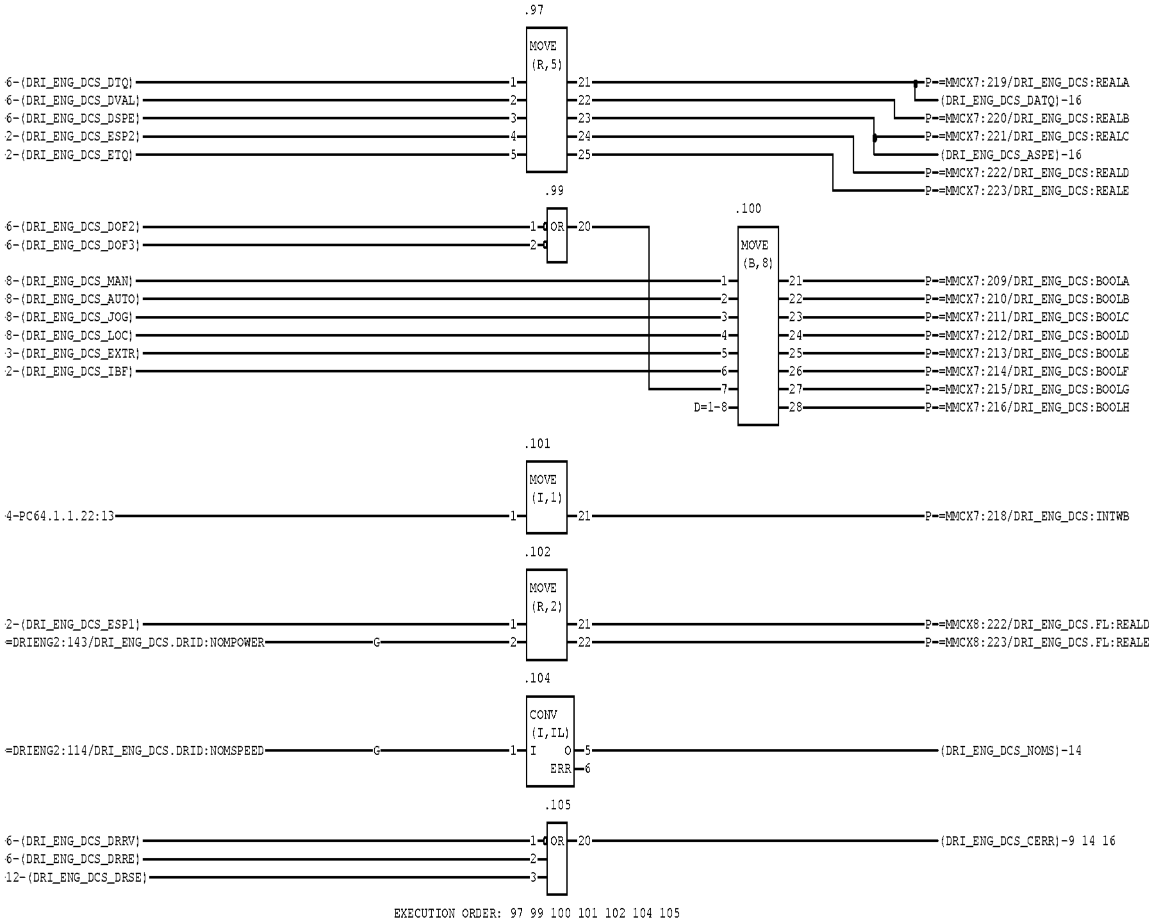

.97
MOVE
(R,5)
6-(DRI_ENG_DCS_DTQ)
6-(DRI_ENG_DCS_DVAL)
6-(DRI_ENG_DCS_DSPE)
2-(DRI_ENG_DCS_ESP2)
2-(DRI_ENG_DCS_ETQ)
1
2
3
4
5
21
22
23
24
25
P==MMCX7:219/DRI_ENG_DCS:REALA
(DRI_ENG_DCS_DATQ)-16
P==MMCX7:220/DRI_ENG_DCS:REALB
P==MMCX7:221/DRI_ENG_DCS:REALC
(DRI_ENG_DCS_ASPE)-16
P==MMCX7:222/DRI_ENG_DCS:REALD
P==MMCX7:223/DRI_ENG_DCS:REALE
.99
OR
6-(DRI_ENG_DCS_DOF2)
6-(DRI_ENG_DCS_DOF3)
1
2
20
.100
MOVE
(B,8)
8-(DRI_ENG_DCS_MAN)
8-(DRI_ENG_DCS_AUTO)
8-(DRI_ENG_DCS_JOG)
8-(DRI_ENG_DCS_LOC)
3-(DRI_ENG_DCS_EXTR)
2-(DRI_ENG_DCS_IBF)
1
2
3
4
5
6
7
D=1-8
21
22
23
24
25
26
27
28
P==MMCX7:209/DRI_ENG_DCS:BOOLA
P==MMCX7:210/DRI_ENG_DCS:BOOLB
P==MMCX7:211/DRI_ENG_DCS:BOOLC
P==MMCX7:212/DRI_ENG_DCS:BOOLD
P==MMCX7:213/DRI_ENG_DCS:BOOLE
P==MMCX7:214/DRI_ENG_DCS:BOOLF
P==MMCX7:215/DRI_ENG_DCS:BOOLG
P==MMCX7:216/DRI_ENG_DCS:BOOLH
.101
MOVE
(I,1)
4-PC64.1.1.22:13
1
21
P==MMCX7:218/DRI_ENG_DCS:INTWB
.102
MOVE
(R,2)
2-(DRI_ENG_DCS_ESP1)
=DRIENG2:143/DRI_ENG_DCS.DRID:NOMPOWER
G
1
2
21
22
P==MMCX8:222/DRI_ENG_DCS.FL:REALD
P==MMCX8:223/DRI_ENG_DCS.FL:REALE
.104
CONV
(I,IL)
=DRIENG2:114/DRI_ENG_DCS.DRID:NOMSPEED
G
1
I
O
ERR
5
6
(DRI_ENG_DCS_NOMS)-14
.105
OR
6-(DRI_ENG_DCS_DRRV)
6-(DRI_ENG_DCS_DRRE)
12-(DRI_ENG_DCS_DRSE)
1
2
3
20
(DRI_ENG_DCS_CERR)-9 14 16
EXECUTION ORDER: 97 99 100 101 102 104 105

Figure C-13. Sheet 13. Storing Data for Presentation

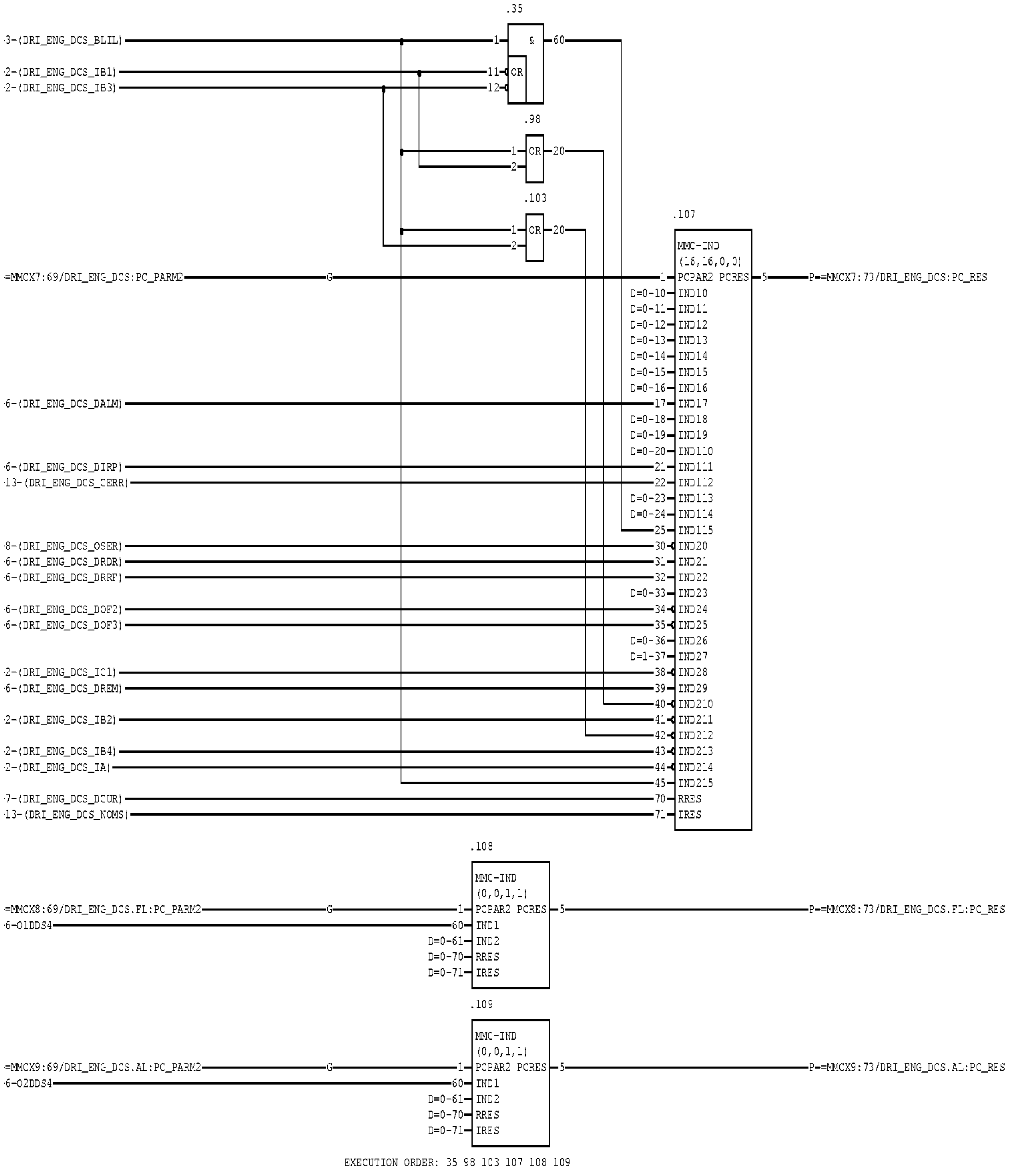

.35
3-(DRI_ENG_DCS_BLIL)
2-(DRI_ENG_DCS_IB1)
2-(DRI_ENG_DCS_IB3)
&
OR
.98
OR
.103
OR
.107
MMC-IND
(16,16,0,0)
=MMCX7:69/DRI_ENG_DCS:PC_PARM2
G
PCPAR2 PCRES
P-=MMCX7:73/DRI_ENG_DCS:PC_RES
D=0-10 IND10
D=0-11 IND11
D=0-12 IND12
D=0-13 IND13
D=0-14 IND14
D=0-15 IND15
D=0-16 IND16
6-(DRI_ENG_DCS_DALM) 17 IND17
D=0-18 IND18
D=0-19 IND19
D=0-20 IND110
6-(DRI_ENG_DCS_DTRP) 21 IND111
13-(DRI_ENG_DCS_CERR) 22 IND112
D=0-23 IND113
D=0-24 IND114
25 IND115
8-(DRI_ENG_DCS_OSER) 30 IND20
6-(DRI_ENG_DCS_DRDR) 31 IND21
6-(DRI_ENG_DCS_DRRF) 32 IND22
D=0-33 IND23
6-(DRI_ENG_DCS_DOF2) 34 IND24
6-(DRI_ENG_DCS_DOF3) 35 IND25
D=0-36 IND26
D=1-37 IND27
2-(DRI_ENG_DCS_IC1) 38 IND28
6-(DRI_ENG_DCS_DREM) 39 IND29
40 IND210
2-(DRI_ENG_DCS_IB2) 41 IND211
42 IND212
2-(DRI_ENG_DCS_IB4) 43 IND213
2-(DRI_ENG_DCS_IA) 44 IND214
45 IND215
7-(DRI_ENG_DCS_DCUR) 70 RRES
13-(DRI_ENG_DCS_NOMS) 71 IRES
.108
MMC-IND
(0,0,1,1)
=MMCX8:69/DRI_ENG_DCS.FL:PC_PARM2
G
PCPAR2 PCRES
P-=MMCX8:73/DRI_ENG_DCS.FL:PC_RES
6-O1DDS4 60 IND1
D=0-61 IND2
D=0-70 RRES
D=0-71 IRES
.109
MMC-IND
(0,0,1,1)
=MMCX9:69/DRI_ENG_DCS.AL:PC_PARM2
G
PCPAR2 PCRES
P-=MMCX9:73/DRI_ENG_DCS.AL:PC_RES
6-O2DDS4 60 IND1
D=0-61 IND2
D=0-70 RRES
D=0-71 IRES
EXECUTION ORDER: 35 98 103 107 108 109

Figure C-14. Sheet 14. Storing Data for Presentation

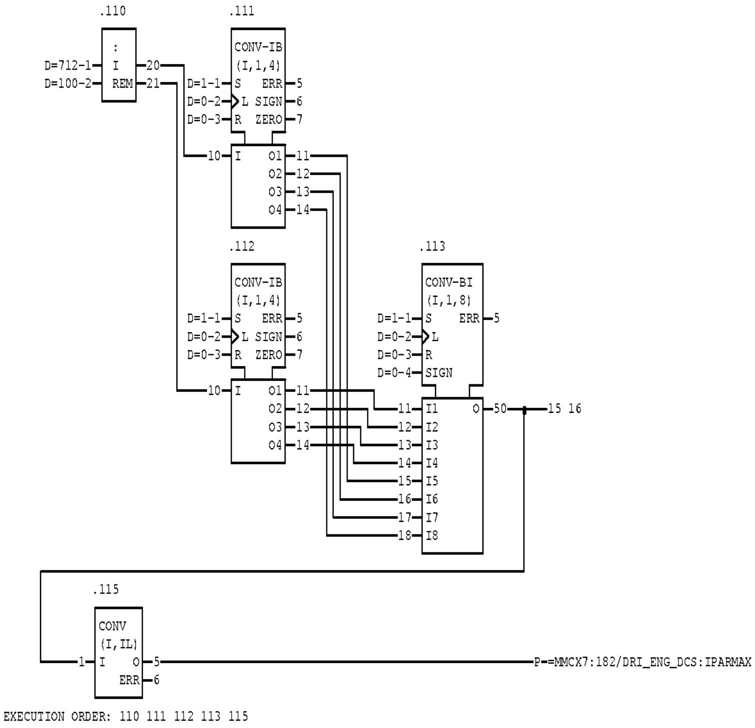


Figure C-15. Sheet 15. Storing Data on Output Terminals

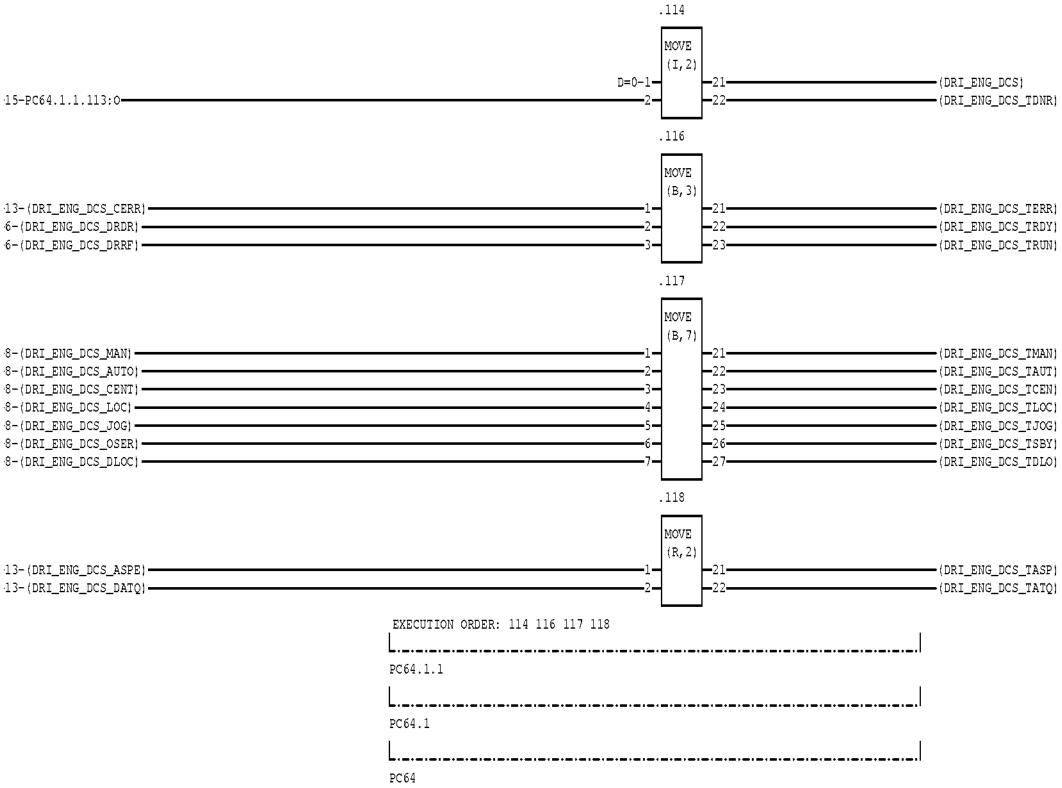


Figure C-16. Sheet 16. Storing Data on Output Terminals

Appendix D PC Diagram DRIS5

D.1 Overview Description DRIS5

The type circuit is made up of several subfunctions. Each subfunction is located on one or more pages of PC-diagram. Following is a short description of each subfunction, and an overview block diagram showing the interconnections between subfunctions.

- Input terminals.

  All input terminals of the type circuit are connected to MOVE elements. They are grouped as on the type circuit element. All internal connections are made to the outputs of these MOVE-elements.

- Operator interface, input.

  All orders, setpoint values, and so on are read from the data base. All internal connections are made to the outputs here.

- Visibility.

  The visibility of current values in operator displays are set according to configuration parameters. Visibility is changed according to control mode input.

- Read from drive unit.

  All status and current values are read from the drive unit and converted to real value representation.

- Point of control.

  Operator changes of point of control and status changes in the drive unit are evaluated. The current point of control is changed if appropriate.

- Interlocks.

  Interlock inputs are evaluated. The current interlock status is changed if appropriate.

- Start/stop.

  Operator and input start/stop orders are evaluated. The drive is started or stopped according to point of control and current interlock status.

- Sending to drive unit.

  Orders and setpoint values are sent to the drive unit.

- Operator interface, output.

  All current values, point of control, interlock status and so on, are read from the data base. All internal connections are made to the outputs here.

- Output terminals

  All output terminals of the type circuit are connected to MOVE elements here.
  All internal connections are made to the inputs of these MOVE elements.

D.2 Overview Block Diagram DRIS5

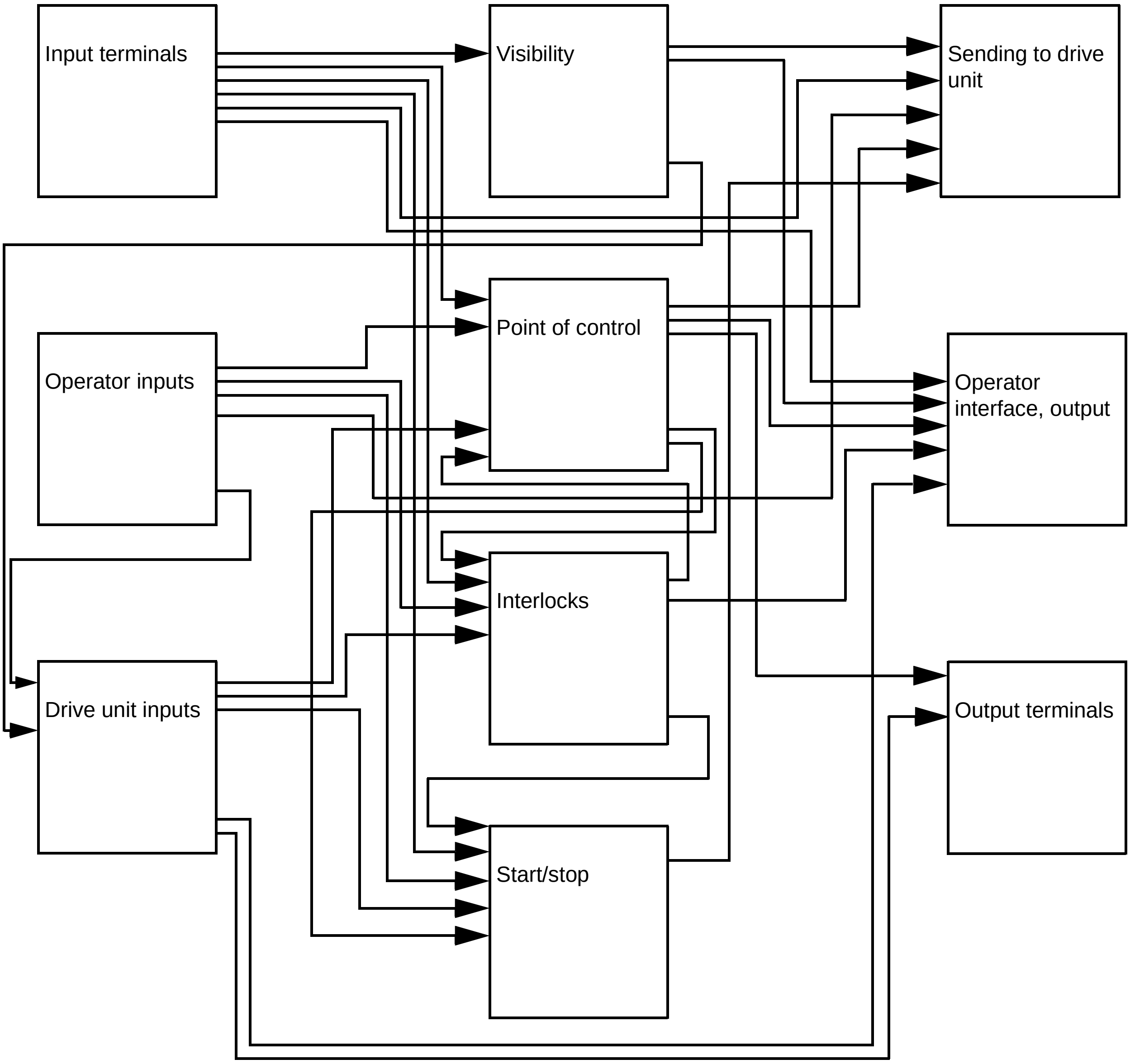


Figure D-1. Overview Diagram DRIS5

D.3 Explanation of PC Names DRIS5

Table D-1. PC Names DRIS5

PC name	Explanation
(<DRIVE_NAME>_AIA)	Sequence interlock A active
(<DRIVE_NAME>_AIB1)	Process interlock B1 active
(<DRIVE_NAME>_AIB2)	Process interlock B2 active
(<DRIVE_NAME>_AIB3)	Process interlock B3 active
(<DRIVE_NAME>_AIB4)	Process interlock B4 active
(<DRIVE_NAME>_ALM1)	Alarmword 1
(<DRIVE_NAME>_ALU)	Unacknowledged alarm
(<DRIVE_NAME>_ASPE)	Actual speed
(<DRIVE_NAME>_ASTA)	Input auto start
(<DRIVE_NAME>_ASTO)	Input auto stop
(<DRIVE_NAME>_AUTO)	Point of control central auto active
(<DRIVE_NAME>_BLIL)	Block interlocks
(<DRIVE_NAME>_CENT)	Point of control central active
(<DRIVE_NAME>_CERR)	Drive unit communication error
(<DRIVE_NAME>_CTRM)	Drive unit control mode
(<DRIVE_NAME>_CURM)	Current max. value
(<DRIVE_NAME>_DALI)	Drive above limit
(<DRIVE_NAME>_DALM)	Drive alarm
(<DRIVE_NAME>_DASP)	Drive at setpoint
(<DRIVE_NAME>_DATQ)	Terminal actual torque
(<DRIVE_NAME>_DCUR)	Drive current
(<DRIVE_NAME>_DINH)	Drive switch on inhibit
(<DRIVE_NAME>_DLOC)	Point of control drive local active
(<DRIVE_NAME>_DMGN)	Drive magnetized
(<DRIVE_NAME>_DOF2)	No OFF2 (emergency off)
(<DRIVE_NAME>_DOF3)	No OFF3 (emergency stop off)
(<DRIVE_NAME>_DRDR)	Drive ready

Table D-1. PC Names DRIS5 (Continued)

PC name	Explanation
(<DRIVE_NAME>_DREM)	Drive remote control
(<DRIVE_NAME>_DRON)	Drive ready to switch on
(<DRIVE_NAME>_DRRE)	DRI-R error
(<DRIVE_NAME>_DRRF)	Drive running
(<DRIVE_NAME>_DRRV)	DRI-R valid
(<DRIVE_NAME>_DRSE)	DRI-S error
(<DRIVE_NAME>_DSPE)	Drive actual speed
(<DRIVE_NAME>_DSTA)	Order start drive
(<DRIVE_NAME>_DTQ)	Drive torque
(<DRIVE_NAME>_DTRP)	Drive tripped (fault)
(<DRIVE_NAME>_DVAL)	Drive value
(<DRIVE_NAME>_ESP1)	Input speed ref. in rpm
(<DRIVE_NAME>_ESP2)	Input speed ref. in %
(<DRIVE_NAME>_ESPP)	External speed ref. max. value
(<DRIVE_NAME>_ETQ)	Input torque ref.
(<DRIVE_NAME>_ETQP)	External torque ref. max. value
(<DRIVE_NAME>_EXTR)	Operator order external reference
(<DRIVE_NAME>_FLT1)	Fault word 1
(<DRIVE_NAME>_FLTR)	Fault reset
(<DRIVE_NAME>_GSTA)	Input group start
(<DRIVE_NAME>_GSTO)	Input group stop
(<DRIVE_NAME>_IA)	Input sequence interlock A
(<DRIVE_NAME>_IB1)	Input process interlock B1
(<DRIVE_NAME>_IB2)	Input process interlock B2
(<DRIVE_NAME>_IB3)	Input process interlock B3
(<DRIVE_NAME>_IB4)	Input process interlock B4
(<DRIVE_NAME>_IBF)	Input select start/operation interlock
(<DRIVE_NAME>_IC1)	Input process interlock C1
(<DRIVE_NAME>_INC1)	Input inching 1

Table D-1. PC Names DRIS5 (Continued)

PC name	Explanation
(<DRIVE_NAME>_INC2)	Input inching 2
(<DRIVE_NAME>_JOG)	Point of control jog active
(<DRIVE_NAME>_JOGF)	Input jog forward
(<DRIVE_NAME>_JOGR)	Input jog reverse
(<DRIVE_NAME>_LOC)	Point of control local active
(<DRIVE_NAME>_LSTA)	Input local start
(<DRIVE_NAME>_LSTO)	Input local stop
(<DRIVE_NAME>_MAN)	Point of control central man active
(<DRIVE_NAME>_MAIS)	Main status word
(<DRIVE_NAME>_NOCU)	Nominal current
(<DRIVE_NAME>_NOIL)	No active interlocks
(<DRIVE_NAME>_NOMS)	Nominal speed
(<DRIVE_NAME>_OAUT)	Operator order auto
(<DRIVE_NAME>_OCEN)	Operator order central
(<DRIVE_NAME>_OFF2)	Input OFF2
(<DRIVE_NAME>_OFF3)	Input OFF3
(<DRIVE_NAME>_OJOG)	Operator order jog
(<DRIVE_NAME>_OLOC)	Operator order local
(<DRIVE_NAME>_OMAN)	Operator order man
(<DRIVE_NAME>_OSER)	Point of control out of service active
(<DRIVE_NAME>_OSTA)	Operator order start
(<DRIVE_NAME>_OSTO)	Operator order stop
(<DRIVE_NAME>_OSTY)	Operator order out of service
(<DRIVE_NAME>_RAHO)	Input ramp hold
(<DRIVE_NAME>_RAIZ)	Input ramp input zero
(<DRIVE_NAME>_RAOZ)	Input ramp output zero
(<DRIVE_NAME>_RCMD)	Input remote command
(<DRIVE_NAME>_RDY)	Drive ready
(<DRIVE_NAME>_REFP)	Order reference in %

Table D-1. PC Names DRIS5 (Continued)

PC name	Explanation
(<DRIVE_NAME>_REFR)	Order reference in rpm
(<DRIVE_NAME>_REFS)	Order reference speed
(<DRIVE_NAME>_REFT)	Order reference torque
(<DRIVE_NAME>_SARE)	Visibility, show engineered arbitrarily value
(<DRIVE_NAME>_SARS)	Visibility, show standard arbitrarily value
(<DRIVE_NAME>_SCUR)	Visibility, show current
(<DRIVE_NAME>_SPEM)	Actual speed max. value
(<DRIVE_NAME>_SPER)	Operator order speed setpoint in rpm
(<DRIVE_NAME>_SPIR)	Visibility, show PID reference
(<DRIVE_NAME>_SPPC)	Operator order setpoint in %
(<DRIVE_NAME>_SPPM)	Setpoint max. in %
(<DRIVE_NAME>_SPRM)	Speed setpoint max. in rpm
(<DRIVE_NAME>_SREF)	Visibility, show reference
(<DRIVE_NAME>_SSPE)	Visibility, show speed
(<DRIVE_NAME>_SSPP)	Visibility, show speed in %
(<DRIVE_NAME>_SSPR)	Visibility, show speed in rpm
(<DRIVE_NAME>_STQ)	Visibility, show torque
(<DRIVE_NAME>_STQR)	Visibility, show torque reference
(<DRIVE_NAME>_TASP)	Terminal actual speed
(<DRIVE_NAME>_TATQ)	Terminal actual torque
(<DRIVE_NAME>_TAUT)	Terminal auto
(<DRIVE_NAME>_TCEN)	Terminal central
(<DRIVE_NAME>_TDLO)	Terminal drive local
(<DRIVE_NAME>_TDNR)	Terminal drive address
(<DRIVE_NAME>_TERR)	Terminal error
(<DRIVE_NAME>_TJOG)	Terminal jog
(<DRIVE_NAME>_TLOC)	Terminal local
(<DRIVE_NAME>_TMAN)	Terminal man
(<DRIVE_NAME>_TRDY)	Terminal ready

Table D-1. PC Names DRIS5 (Continued)

PC name	Explanation
(<DRIVE_NAME>_TRQM)	Torque max. value
(<DRIVE_NAME>_TRUN)	Terminal running
(<DRIVE_NAME>_TSBY)	Terminal out of service
(<DRIVE_NAME>_VALM)	Value max. value

D.4 Detailed PC Diagram DRIS5

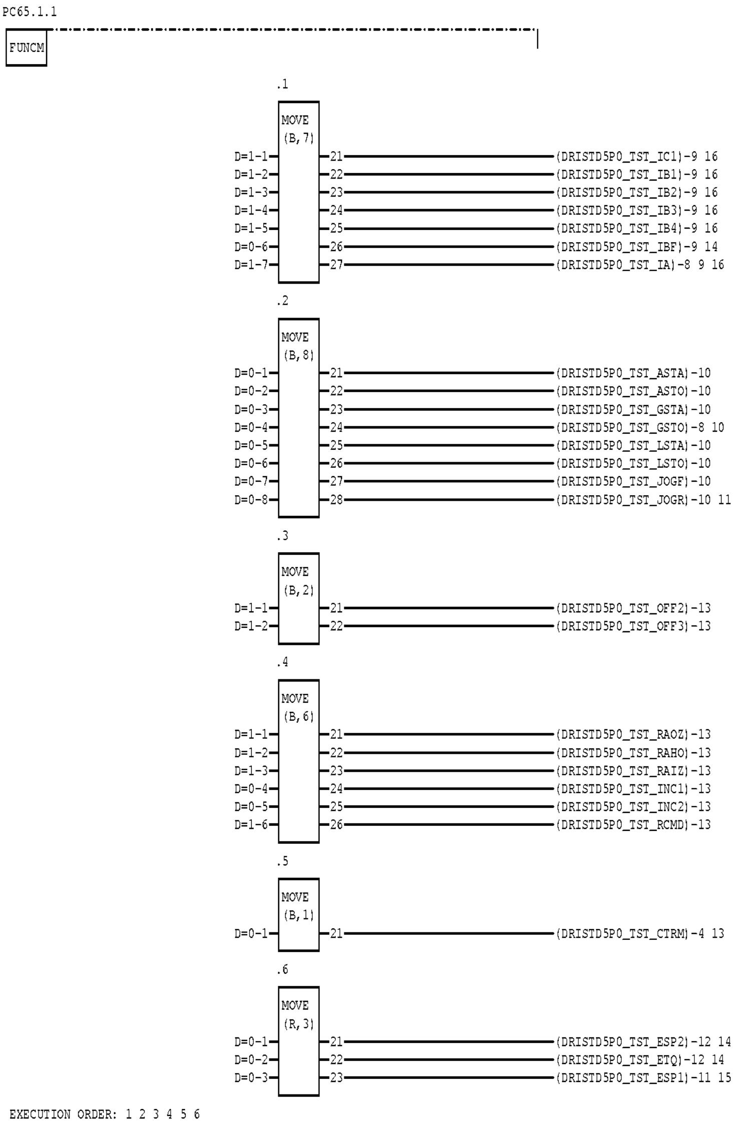


Figure D-2. Sheet 2. Reading Data from Input Terminals

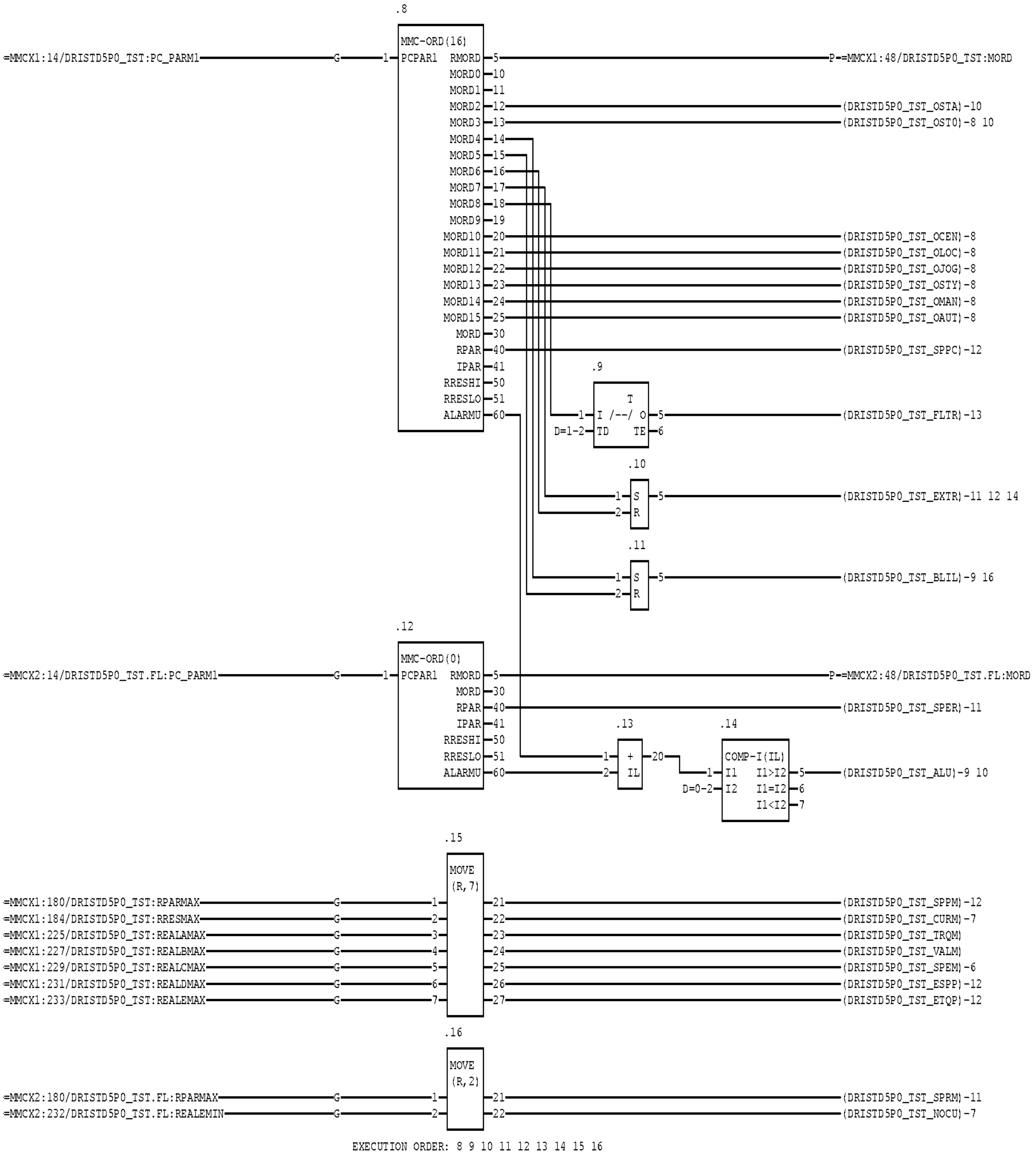

.8
MMC-ORD(16)
=MMCX1:14/DRISTD5P0_TST:PC_PARM1
G
1
PCPAR1
RMORD 5
P-=MMCX1:48/DRISTD5P0_TST:MORD
MORD0 10
MORD1 11
MORD2 12
(DRISTD5P0_TST_OSTA)-10
MORD3 13
(DRISTD5P0_TST_OST0)-8 10
MORD4 14
MORD5 15
MORD6 16
MORD7 17
MORD8 18
MORD9 19
MORD10 20
(DRISTD5P0_TST_OCEN)-8
MORD11 21
(DRISTD5P0_TST_OLOC)-8
MORD12 22
(DRISTD5P0_TST_OJOG)-8
MORD13 23
(DRISTD5P0_TST_OSTY)-8
MORD14 24
(DRISTD5P0_TST_OMAN)-8
MORD15 25
(DRISTD5P0_TST_OAUT)-8
MORD 30
RPAR 40
(DRISTD5P0_TST_SPPC)-12
IPAR 41
RRESHI 50
RRESLO 51
ALARMU 60
.9
T
1 I /--/ O 5
D=1-2 TD TE 6
(DRISTD5P0_TST_FLTR)-13
.10
1 S 5
2 R
(DRISTD5P0_TST_EXTR)-11 12 14
.11
1 S 5
2 R
(DRISTD5P0_TST_BLIL)-9 16
.12
MMC-ORD(0)
=MMCX2:14/DRISTD5P0_TST.FL:PC_PARM1
G
1
PCPAR1
RMORD 5
P-=MMCX2:48/DRISTD5P0_TST.FL:MORD
MORD 30
RPAR 40
(DRISTD5P0_TST_SPER)-11
IPAR 41
RRESHI 50
RRESLO 51
ALARMU 60
.13
1 + 20
2 IL
.14
COMP-I(IL)
1 I1 I1>I2 5
D=0-2 I2 I1=I2 6
I1<I2 7
(DRISTD5P0_TST_ALU)-9 10
.15
MOVE
(R,7)
=MMCX1:180/DRISTD5P0_TST:RPARMAX G 1 21 (DRISTD5P0_TST_SPPM)-12
=MMCX1:184/DRISTD5P0_TST:RRESMAX G 2 22 (DRISTD5P0_TST_CURM)-7
=MMCX1:225/DRISTD5P0_TST:REALAMAX G 3 23 (DRISTD5P0_TST_TRQM)
=MMCX1:227/DRISTD5P0_TST:REALBMAX G 4 24 (DRISTD5P0_TST_VALM)
=MMCX1:229/DRISTD5P0_TST:REALCMAX G 5 25 (DRISTD5P0_TST_SPEM)-6
=MMCX1:231/DRISTD5P0_TST:REALDMAX G 6 26 (DRISTD5P0_TST_ESPP)-12
=MMCX1:233/DRISTD5P0_TST:REALEMAX G 7 27 (DRISTD5P0_TST_ETQP)-12
.16
MOVE
(R,2)
=MMCX2:180/DRISTD5P0_TST.FL:RPARMAX G 1 21 (DRISTD5P0_TST_SPRM)-11
=MMCX2:232/DRISTD5P0_TST.FL:REALEMIN G 2 22 (DRISTD5P0_TST_NOCU)-7
EXECUTION ORDER: 8 9 10 11 12 13 14 15 16

Figure D-3. Sheet 3. Reading from Dialogs

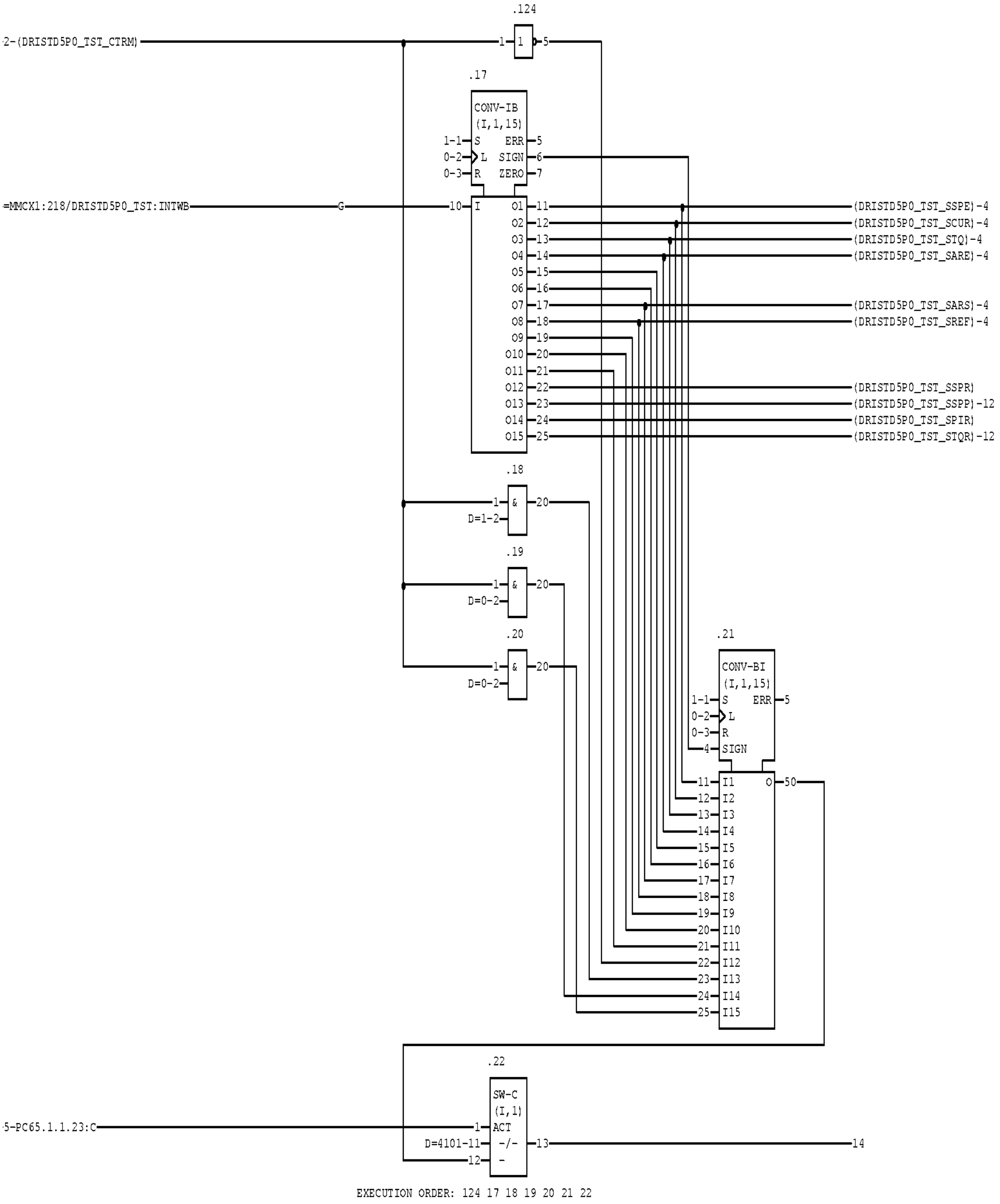


Figure D-4. Sheet 4. Visibility Control

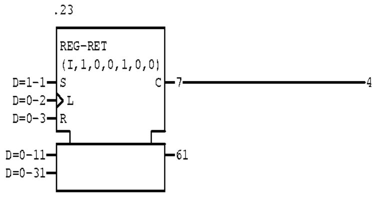
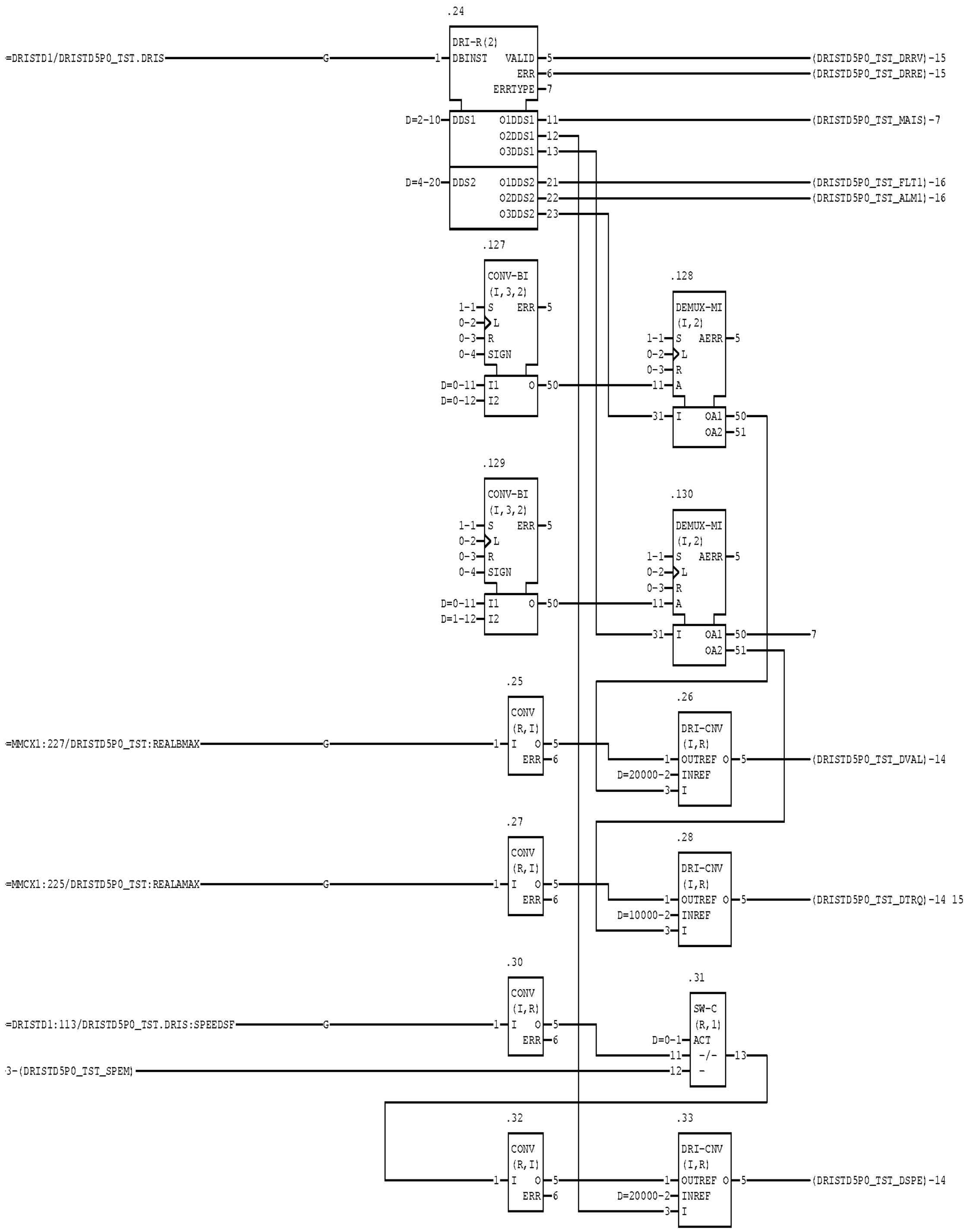


Figure D-5. Sheet 5. Visibility Control



EXECUTION ORDER: 24 127 128 129 130 25 26 27 28 30 31 32 33

Figure D-6. Sheet 6. Reading from Drive Unit

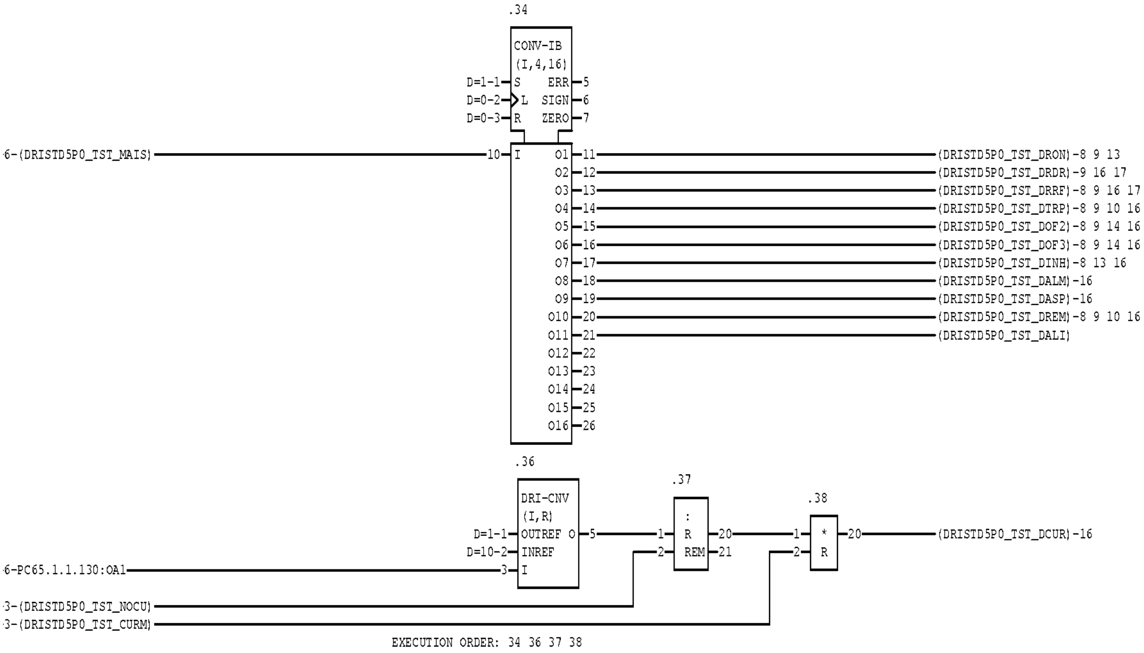


Figure D-7. Sheet 7. Reading from Drive Unit

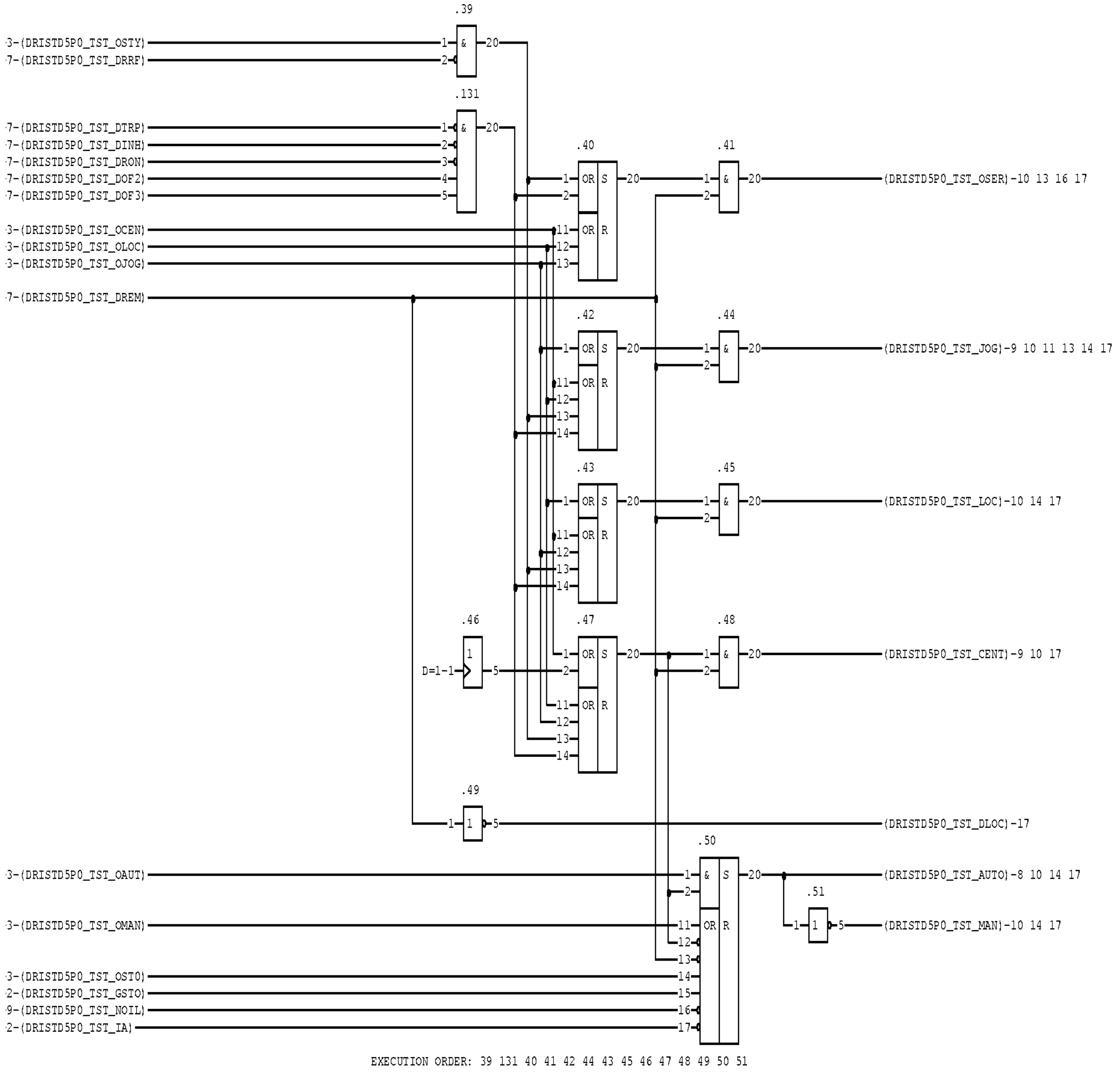


Figure D-8. Sheet 8. Point of Control

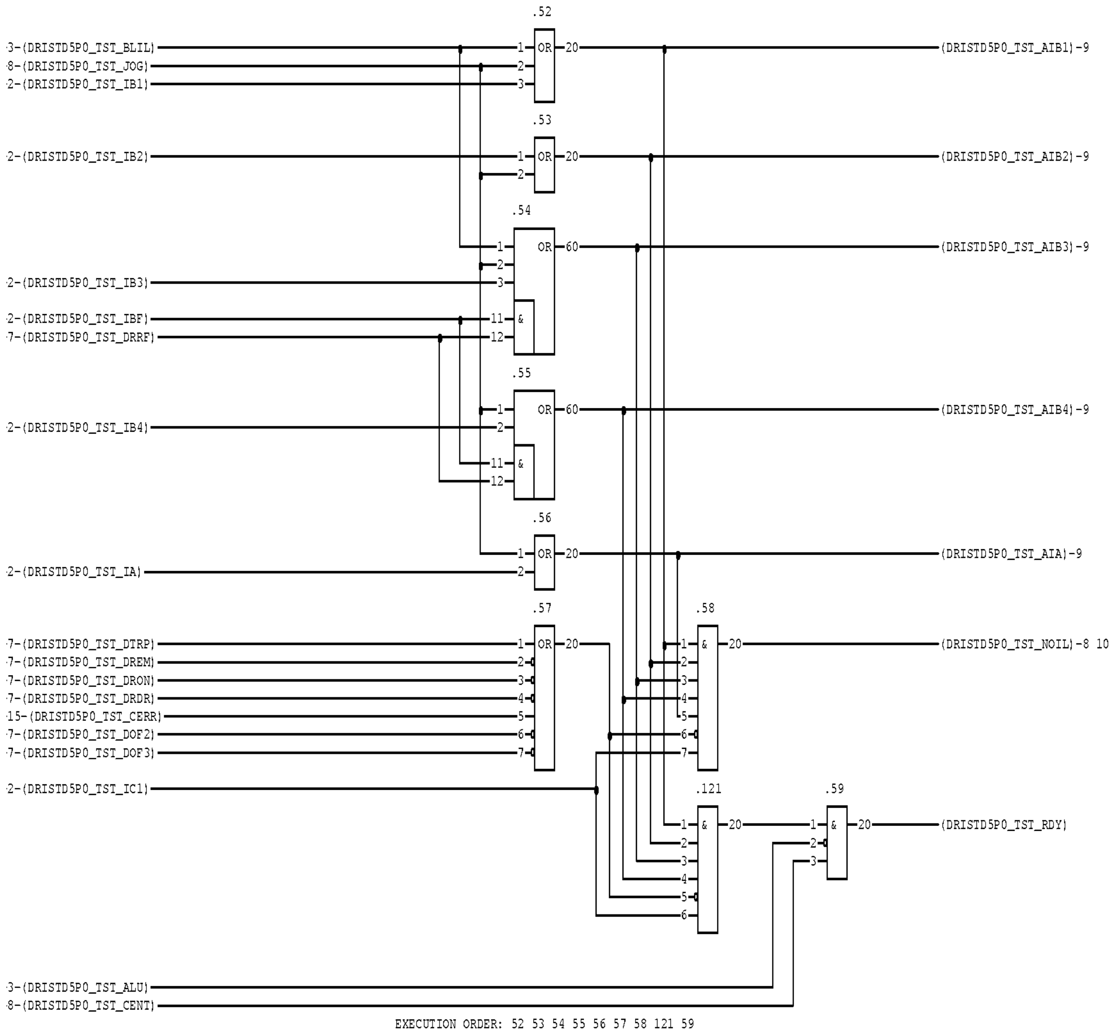


Figure D-9. Sheet 9. Interlocks

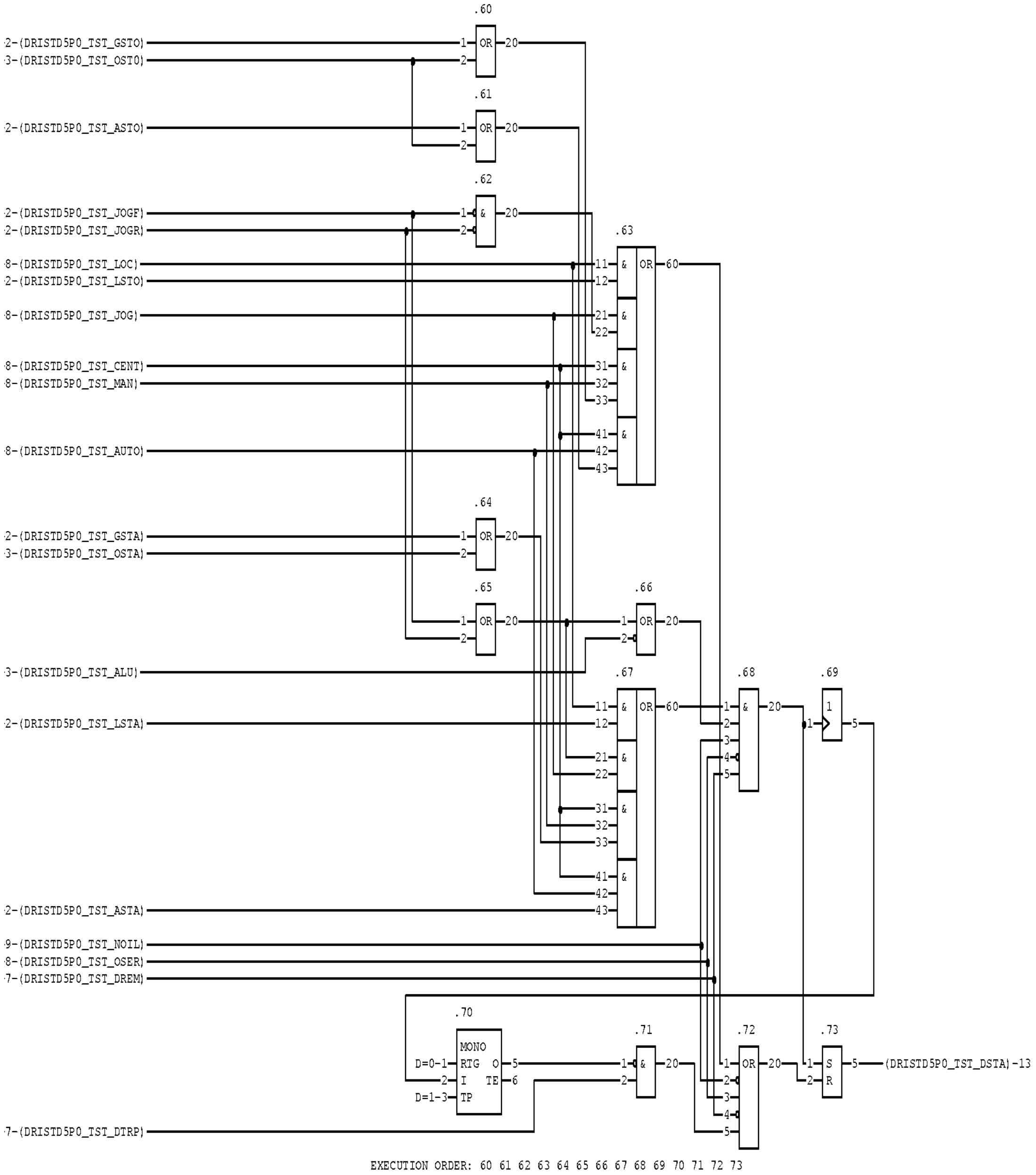


Figure D-10. Sheet 10. Start/Stop

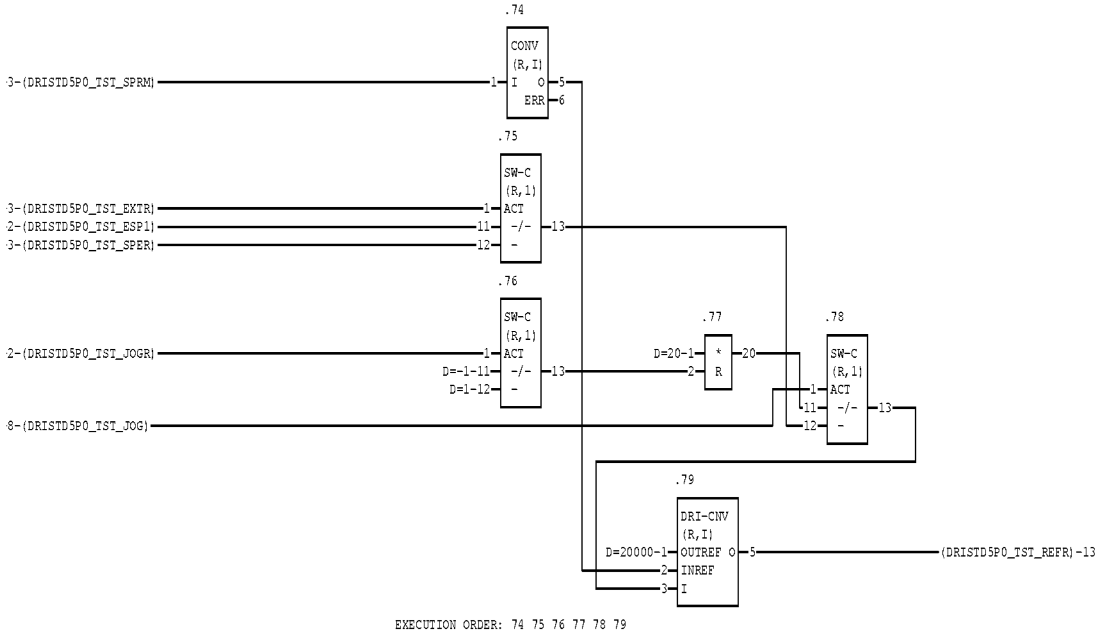


Figure D-11. Sheet 11. Sending to Drive Unit

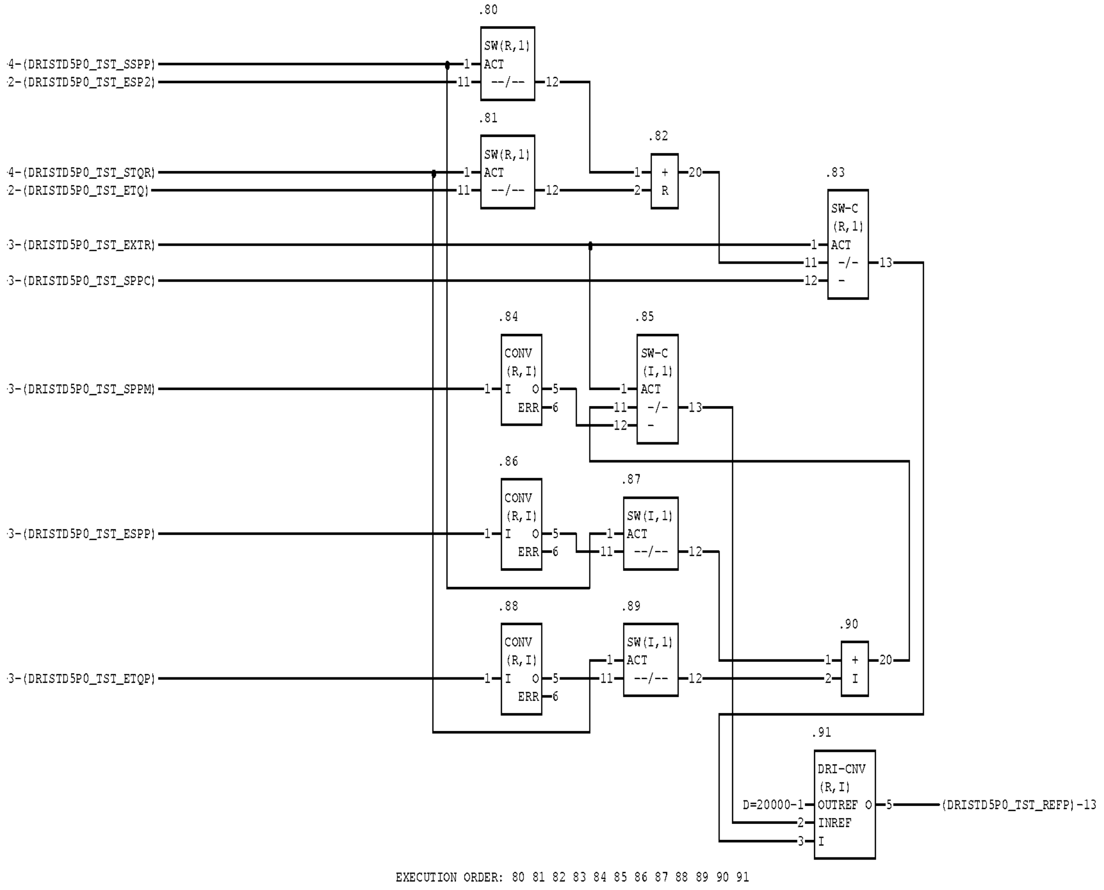


Figure D-12. Sheet 12. Sending to Drive Unit

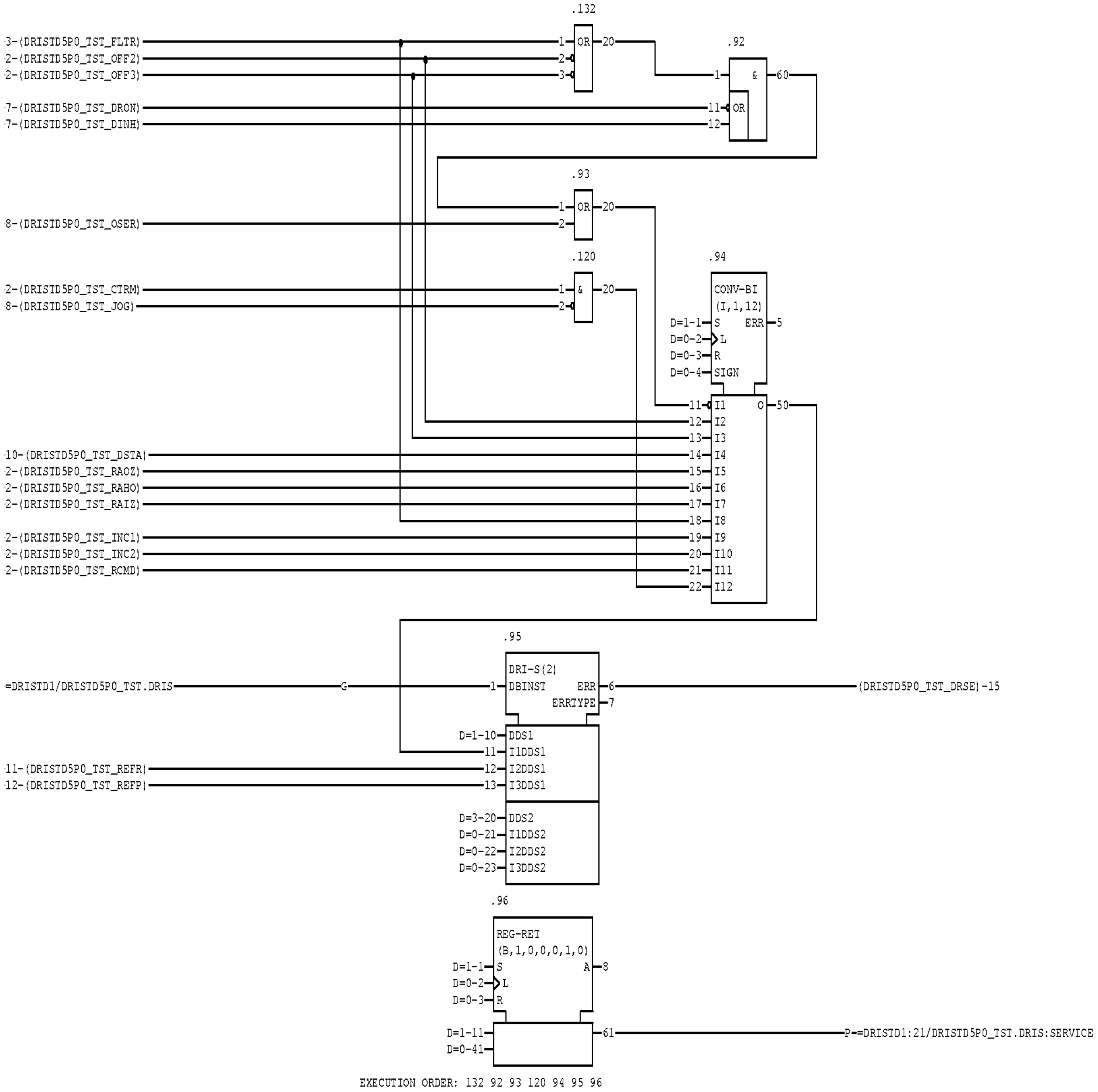


Figure D-13. Sheet 13. Sending to Drive Unit

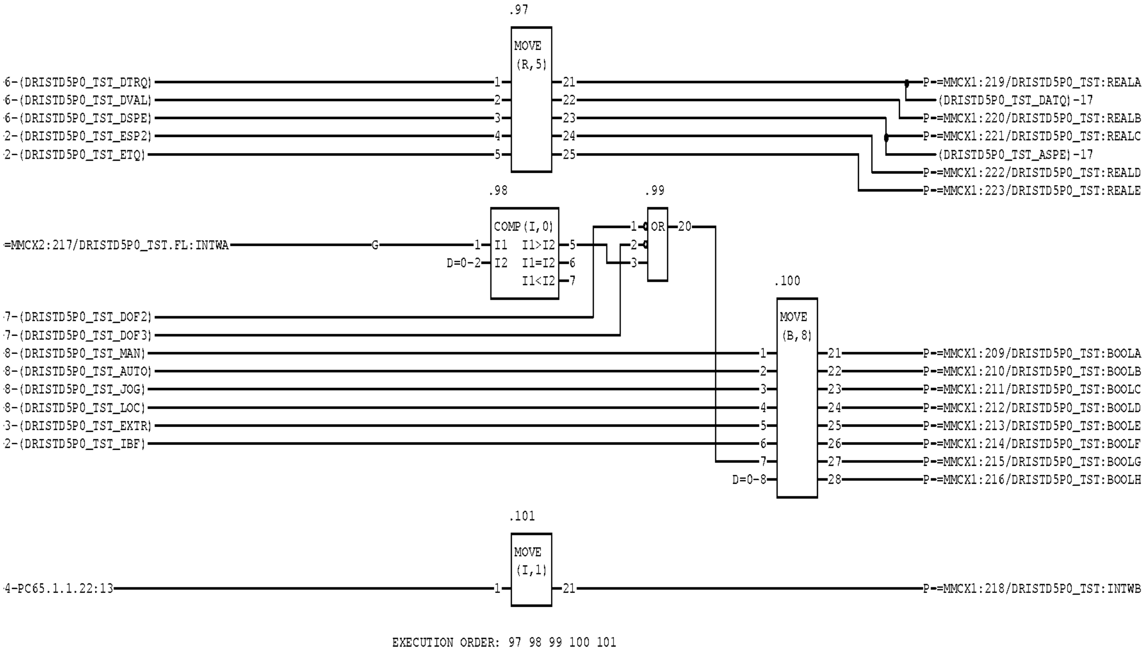

.97
MOVE
(R,5)
6-(DRISTD5P0_TST_DTRQ)
6-(DRISTD5P0_TST_DVAL)
6-(DRISTD5P0_TST_DSPE)
2-(DRISTD5P0_TST_ESP2)
2-(DRISTD5P0_TST_ETQ)
P-=MMCX1:219/DRISTD5P0_TST:REALA
(DRISTD5P0_TST_DATQ)-17
P-=MMCX1:220/DRISTD5P0_TST:REALB
P-=MMCX1:221/DRISTD5P0_TST:REALC
(DRISTD5P0_TST_ASPE)-17
P-=MMCX1:222/DRISTD5P0_TST:REALD
P-=MMCX1:223/DRISTD5P0_TST:REALE
.98
COMP(I,0)
I1
I2
I1>I2
I1=I2
I1<I2
=MMCX2:217/DRISTD5P0_TST.FL:INTWA
G
D=0-2
.99
OR
.100
MOVE
(B,8)
7-(DRISTD5P0_TST_DOF2)
7-(DRISTD5P0_TST_DOF3)
8-(DRISTD5P0_TST_MAN)
8-(DRISTD5P0_TST_AUTO)
8-(DRISTD5P0_TST_JOG)
8-(DRISTD5P0_TST_LOC)
3-(DRISTD5P0_TST_EXTR)
2-(DRISTD5P0_TST_IBF)
D=0-8
P-=MMCX1:209/DRISTD5P0_TST:BOOLA
P-=MMCX1:210/DRISTD5P0_TST:BOOLB
P-=MMCX1:211/DRISTD5P0_TST:BOOLC
P-=MMCX1:212/DRISTD5P0_TST:BOOLD
P-=MMCX1:213/DRISTD5P0_TST:BOOLE
P-=MMCX1:214/DRISTD5P0_TST:BOOLF
P-=MMCX1:215/DRISTD5P0_TST:BOOLG
P-=MMCX1:216/DRISTD5P0_TST:BOOLH
.101
MOVE
(I,1)
4-PC65.1.1.22:13
P-=MMCX1:218/DRISTD5P0_TST:INTWB
EXECUTION ORDER: 97 98 99 100 101

Figure D-14. Sheet 14. Storing Data for Presentation

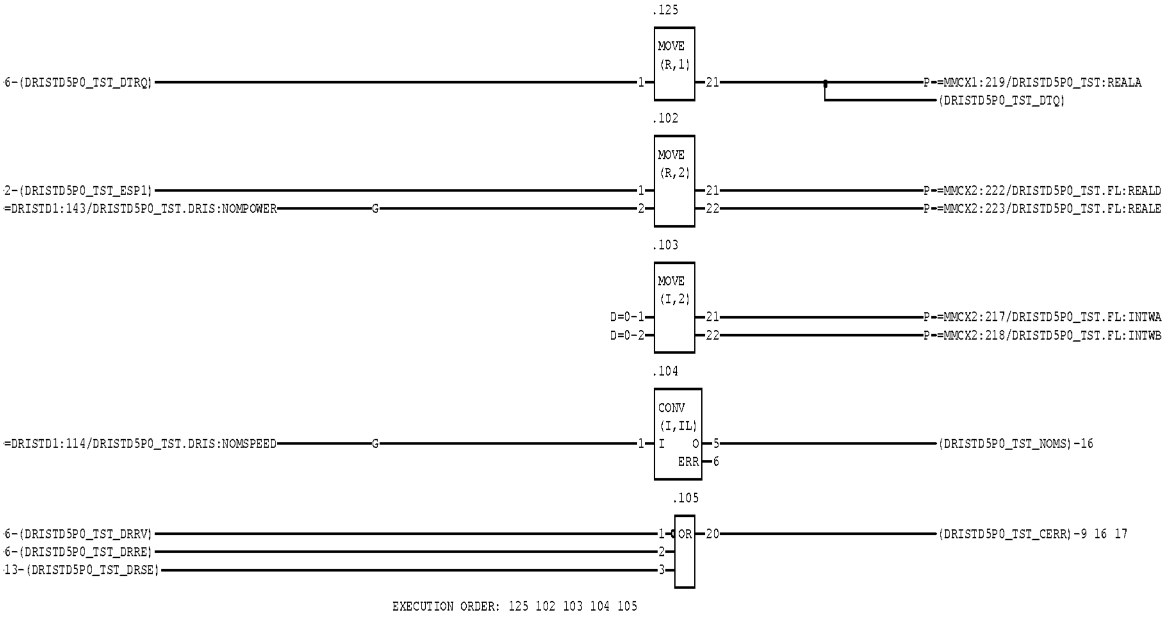

.125
MOVE
(R,1)
6-(DRISTD5P0_TST_DTRQ)
P-=MMCX1:219/DRISTD5P0_TST:REALA
(DRISTD5P0_TST_DTQ)
.102
MOVE
(R,2)
2-(DRISTD5P0_TST_ESP1)
=DRISTD1:143/DRISTD5P0_TST.DRIS:NOMPOWER
G
P-=MMCX2:222/DRISTD5P0_TST.FL:REALD
P-=MMCX2:223/DRISTD5P0_TST.FL:REALE
.103
MOVE
(I,2)
D=0-1
D=0-2
P-=MMCX2:217/DRISTD5P0_TST.FL:INTWA
P-=MMCX2:218/DRISTD5P0_TST.FL:INTWB
.104
CONV
(I,IL)
I
O
ERR
=DRISTD1:114/DRISTD5P0_TST.DRIS:NOMSPEED
G
(DRISTD5P0_TST_NOMS)-16
.105
OR
6-(DRISTD5P0_TST_DRRV)
6-(DRISTD5P0_TST_DRRE)
13-(DRISTD5P0_TST_DRSE)
(DRISTD5P0_TST_CERR)-9 16 17
EXECUTION ORDER: 125 102 103 104 105

Figure D-15. Sheet 15. Storing Data for Presentation

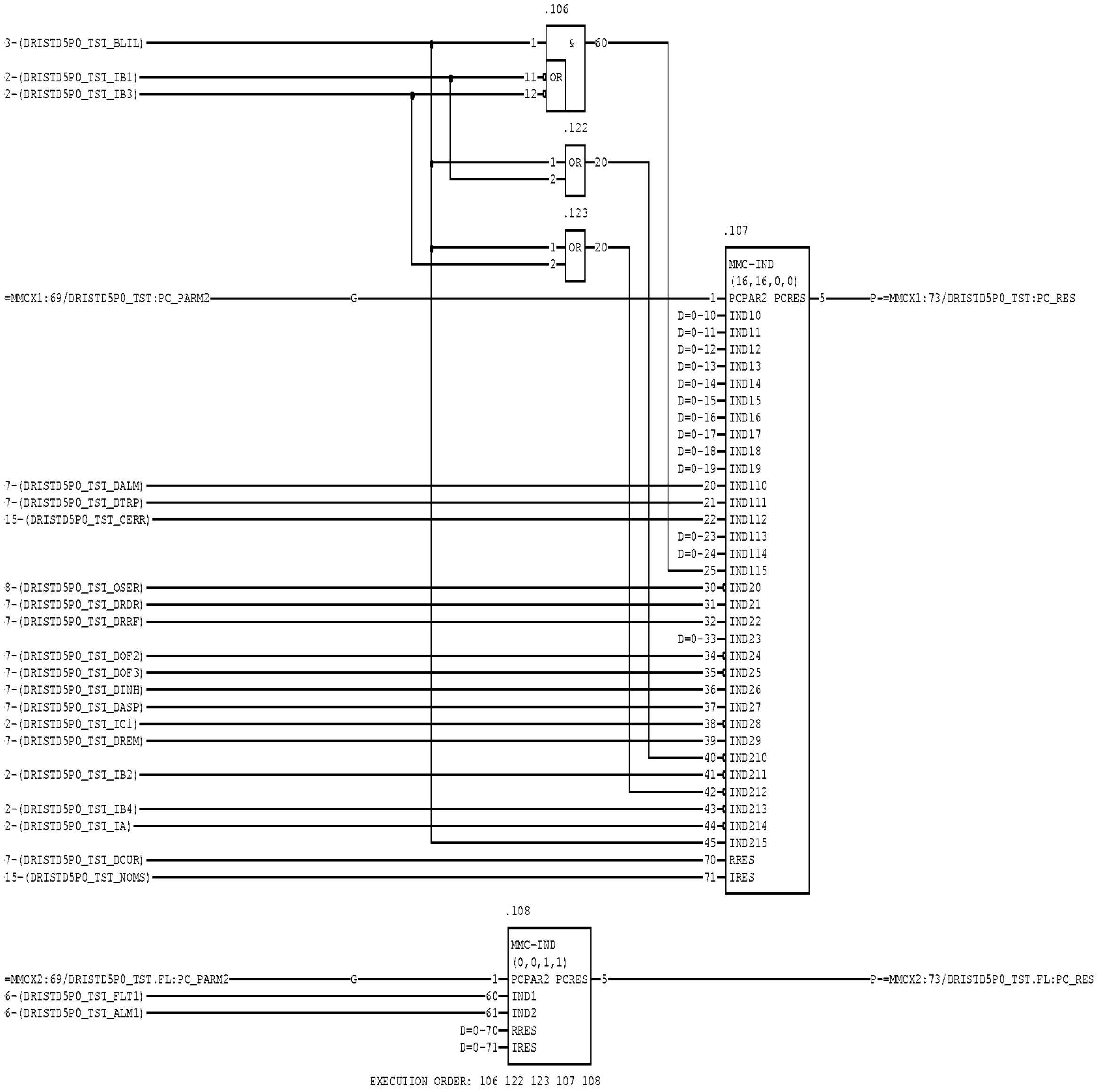

.106
3-(DRISTD5P0_TST_BLIL)
1
&
60
2-(DRISTD5P0_TST_IB1)
11
OR
2-(DRISTD5P0_TST_IB3)
12
.122
1
OR
20
2
.123
1
OR
20
2
.107
MMC-IND
(16,16,0,0)
=MMCX1:69/DRISTD5P0_TST:PC_PARM2
G
1
PCPAR2 PCRES
5
P-=MMCX1:73/DRISTD5P0_TST:PC_RES
D=0-10 IND10
D=0-11 IND11
D=0-12 IND12
D=0-13 IND13
D=0-14 IND14
D=0-15 IND15
D=0-16 IND16
D=0-17 IND17
D=0-18 IND18
D=0-19 IND19
7-(DRISTD5P0_TST_DALM) 20 IND110
7-(DRISTD5P0_TST_DTRP) 21 IND111
15-(DRISTD5P0_TST_CERR) 22 IND112
D=0-23 IND113
D=0-24 IND114
25 IND115
8-(DRISTD5P0_TST_OSER) 30 IND20
7-(DRISTD5P0_TST_DRDR) 31 IND21
7-(DRISTD5P0_TST_DRRF) 32 IND22
D=0-33 IND23
7-(DRISTD5P0_TST_DOF2) 34 IND24
7-(DRISTD5P0_TST_DOF3) 35 IND25
7-(DRISTD5P0_TST_DINH) 36 IND26
7-(DRISTD5P0_TST_DASP) 37 IND27
2-(DRISTD5P0_TST_IC1) 38 IND28
7-(DRISTD5P0_TST_DREM) 39 IND29
40 IND210
2-(DRISTD5P0_TST_IB2) 41 IND211
42 IND212
2-(DRISTD5P0_TST_IB4) 43 IND213
2-(DRISTD5P0_TST_IA) 44 IND214
45 IND215
7-(DRISTD5P0_TST_DCUR) 70 RRES
15-(DRISTD5P0_TST_NOMS) 71 IRES
.108
MMC-IND
(0,0,1,1)
=MMCX2:69/DRISTD5P0_TST.FL:PC_PARM2
G
1
PCPAR2 PCRES
5
P-=MMCX2:73/DRISTD5P0_TST.FL:PC_RES
6-(DRISTD5P0_TST_FLT1) 60 IND1
6-(DRISTD5P0_TST_ALM1) 61 IND2
D=0-70 RRES
D=0-71 IRES
EXECUTION ORDER: 106 122 123 107 108

Figure D-16. Sheet 16. Storing Data for Presentation

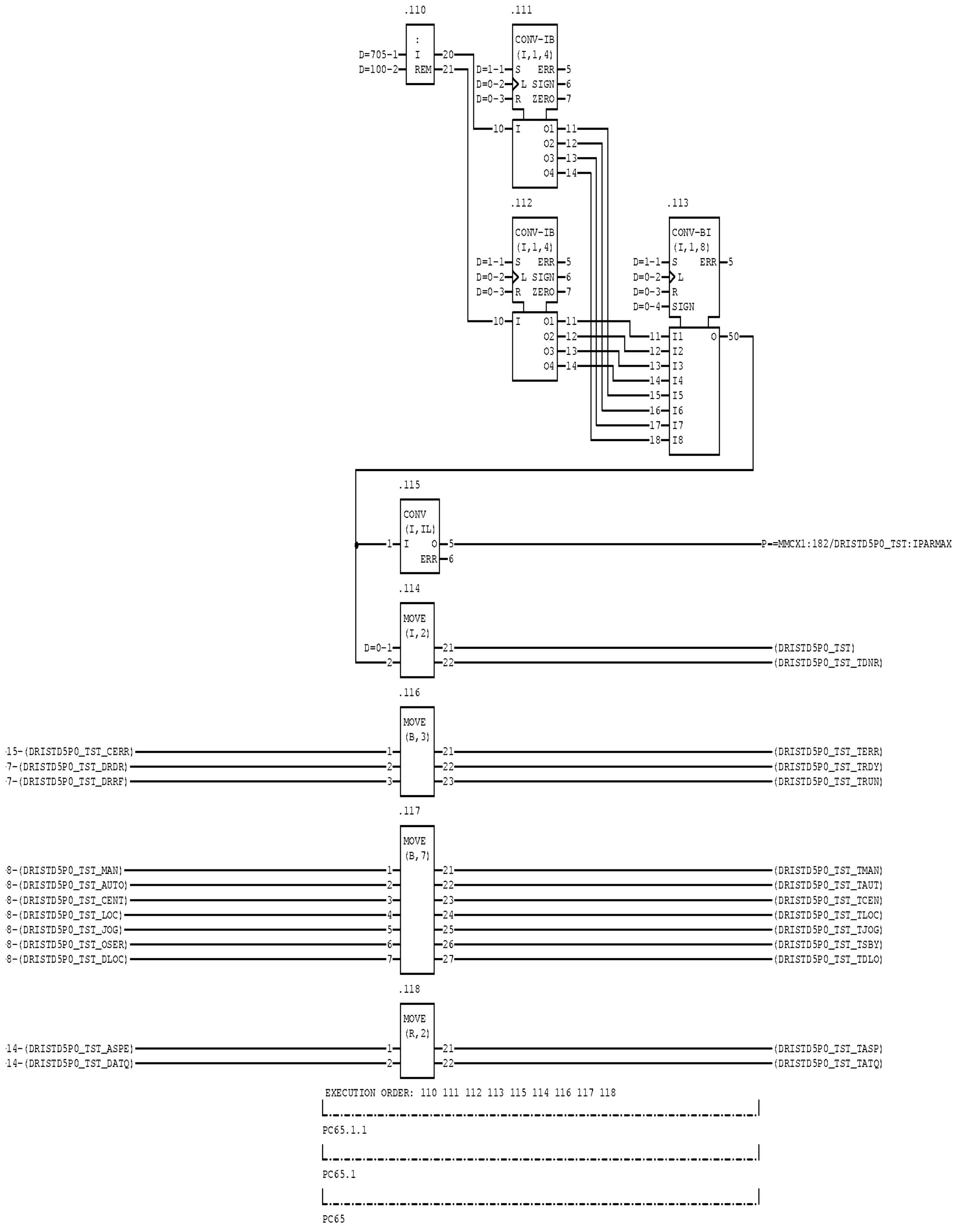


Figure D-17. Sheet 17. Storing Data on Output Terminals

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A

AdvaBuild 2-1
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